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AMERICAN ANTIQUITY

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INTER-AGENCY ARCHAEOLOGICAL SALVAGE PROGRAM: RESULTS OF RESEARCH IN VARIOUS RIVER BASINS OF THE UNITED STATES

FOREWORD

In the April 1947 issue of *American Antiquity* a number of papers pertaining to the initiation of a river basin archaeological program were published. The main theme of the papers was the objectives and plans for a major program of scientific salvage in areas where Federal projects for flood control, irrigation, hydro-electric installations, and navigation improvements in the river basins of the United States would destroy archaeological remains. Two years later, in the April 1949 issue of *American Antiquity*, a series of papers was published dealing with the results of excavations in the Missouri Basin. Some of the papers were by members of the Missouri Basin staff of the River Basin Surveys of the Smithsonian Institution while others were by people representing several local institutions which had joined the salvage program as cooperating members. Subsequently individual articles appeared such as the one pertaining to "The Lake Spring Site, Columbia County, Georgia," by Carl F. Miller which was published in the July 1949 issue; the article by Wesley L. Bliss, "Birdshead Cave, A Stratified Site in the Wind River Basin, Wyoming," published in the January 1950 number; the one by Douglas Osborne, "An Archaeological Survey of the Benham Falls Reservoir, Oregon," and the "Preliminary Report on the Excavation of an Etowah Valley Site," by William H. Sears, both of which were in the October 1950 issue.

The present series of papers,* with the exception of those on the Columbia Basin, pertains to widely scattered projects. The paper by Stephenson reports on only one of a number of investigations which have been made in Texas. Reports on the others will be forthcoming in the near future. The project discussed by Lehmer for Oklahoma is the only excavation carried on thus far as an independent effort of the River Basin Surveys. Other work has been done in that area in cooperation with the University of Oklahoma and the results will ultimately be published by that institution. The article on the Booger Bottom Mound in Georgia is a preliminary statement covering the results of testing at an important site along the Chattahoochee River in northern Georgia. Extensive excavations have been made in Georgia by the River Basin Surveys and detailed reports on the results are fast nearing completion.

In view of the fact that the Missouri Basin was well represented in the April 1949 issue, only two papers from that area appear in the present group. Neither is a detailed report on a single site. One, using the evidence obtained from excavations at two sites as a basis, sets up a sequence of cultural complexes for a group of previously excavated sites within a 30 miles radius of the Oahe Dam near Pierre, S. D. The other suggests butchering techniques as indicated by the bones from two sites in western South Dakota. Excavations have been made in a number of proposed reservoir basins in California by the River Basin Surveys and by the University of California Archaeological Survey. The present paper giving the results of digging at the Slick Rock Village provides an interesting illustration of how archaeological and ethnological evidence complement each other and provide a more detailed picture of a historic village than could be obtained from only a single source. The four papers pertaining to the Columbia Basin summarize the results of investigations in four different reservoir projects. The actual field work in all four cases was done under the direction of the

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River Basin Surveys, although there was some cooperation by local institutions. Douglas Osborne, who was in charge during the summer of 1950, was on leave of absence from the University of Washington for the field season. Samuel J. Tobin, who supervised the excavations in the rock shelter at the Equalizing Reservoir, was unable to complete his report before he was recalled to duty by the Army and the study of the material culture from it was made by John E. Mills and Carolyn Osborne of the University of Washington. The same situation held in the case of the work which Tobin did at the Chief Joseph Reservoir and in addition George Cheney, who was in charge of one of the parties at that project, accepted a new position and could not prepare his report. Consequently, the Chief Joseph article was written by Douglas Osborne, Robert Crabtree, and Alan Bryan. Late stages of the work at Chief Joseph were in cooperation with the University of Washington. The investigations at the O'Sullivan Reservoir were a cooperative undertaking under the immediate supervision of Richard D. Daugherty of The State College of Washington.

In all cases the articles are concerned with materials that will be or would have been involved in the Federal construction program.

FRANK H. H. ROBERTS, JR.
River Basin Surveys
Smithsonian Institution
Washington, D.C.
January 1952

THE HOGGE BRIDGE SITE AND THE WYLIE FOCUS

ROBERT L. STEPHENSON

THE LAVON DAM and Reservoir, under construction by the Corps of Engineers, Department of the Army, is one of the many projects throughout the country which will soon obliterate information relating to the prehistory of North America. This particular project is located on the East Fork of the Trinity River in Collin County, Texas, 21 miles northeast of Dallas. It was scheduled for completion in January, 1952.

The Trinity River is one of several major rivers flowing in a southeasterly direction across the state of Texas. It heads in four branches north and northwest of the city of Dallas and flows into Galveston Bay and thence into the Gulf of Mexico, approximately 40 miles due east of the city of Houston. The East Fork (and its principal tributary, Pilot Grove Creek) is the easternmost of the headwater branches. It rises in Grayson County and enters the main stream in southwestern Kaufman County. The entire area lies within the eastern Cross Timbers region of the Coastal Plains physiographic province (Raisz, 1939). The general terrain is low and rolling with the streams forming shallow U-shaped valleys, roughly 100 feet below the crests of the uplands. The basic geological formation in the area is the Taylor marl. This is overlain by a layer of yellowish orange clay on top of which is a heavy, black topsoil (Schuler, 1918, pp. 23-9). Natural vegetation is quite heavy along the stream channels and consists of walnut, pecan, persimmon, bois-d'arc, cottonwood, hackberry, black locust, post oak and elm, with the normally accompanying brambles and underbrush. Back from the stream channels the land is largely cleared and is either in cultivation or pasture. This land has been cleared for almost a century, prior to which time it was partially timbered. Cotton, corn, onions, melons, peanuts and maizes are the principal crops raised here now. The East Fork provides a year round water supply and from it fish and freshwater mussels are available. Game, including deer, squirrel, rabbit, opossum, skunk, racoon and others was abundant until recent times.

For more than 25 years local amateur archaeologists have recognized the area as containing remains of numerous Indian villages. Several of these people, particularly L. L. Wilson and Rex Housewright, have systematically located, recorded and made collections from over half a hundred sites in this area. In 1939 the Dallas Archaeological Society was formed under the leadership of R. K. Harris and Forrest Kirkland. Added stimulus was thus given to archaeological interests. In several of the sites extensive test excavations were made and recorded in the monthly bulletin, *The Record*. As a result of these test excavations and their coordinated efforts they were able to recognize three types of sites along the East Fork drainage: (1) non-pottery sites, (2) small pottery sites with no evidence of earthworks, and (3) larger pottery sites containing a peculiar sort of earthwork in the shape of a large circular pit with an embankment built up around it (Housewright, et al., 1947, p. 8).

In 1948 the River Basin Surveys' program undertook an archaeological survey of that area of the East Fork drainage to be inundated by the Lavon Reservoir (Stephenson, 1949b, pp. 21-62). This field party examined 25 sites and conducted test excavations in two of them. These test excavations were in a midden deposit in the Campbell Hole site and in the large circular pit in the Hogge Bridge site (Stephenson, 1949a, pp. 53-5). Further extensive excavation was recommended. In 1950 the River Basin Surveys began extensive excavation in the Hogge Bridge site, spending six weeks in the field.*

* Throughout the River Basin Surveys' work in this area the following organizations and individuals provided invaluable assistance in a multitude of ways and grateful appreciation is expressed to them: The National Park Service; The Department of Anthropology of the University of Texas; The Galveston and Fort Worth District Offices of the Corps of Engineers, and the Lavon Field Office of the Corps of Engineers; the Dallas Archaeological Society, particularly R. K. Harris, Lester L. Wilson, and Rex Housewright of that group; Alex D. Krieger and T. N. Campbell of the Department of Anthropology of the University of Texas; Glen Evans of the Texas Memorial Museum; and the entire field crew, particularly E. B. Jelks, assistant archaeologist, E. O. Miller and E. H. Moorman, crew chiefs.

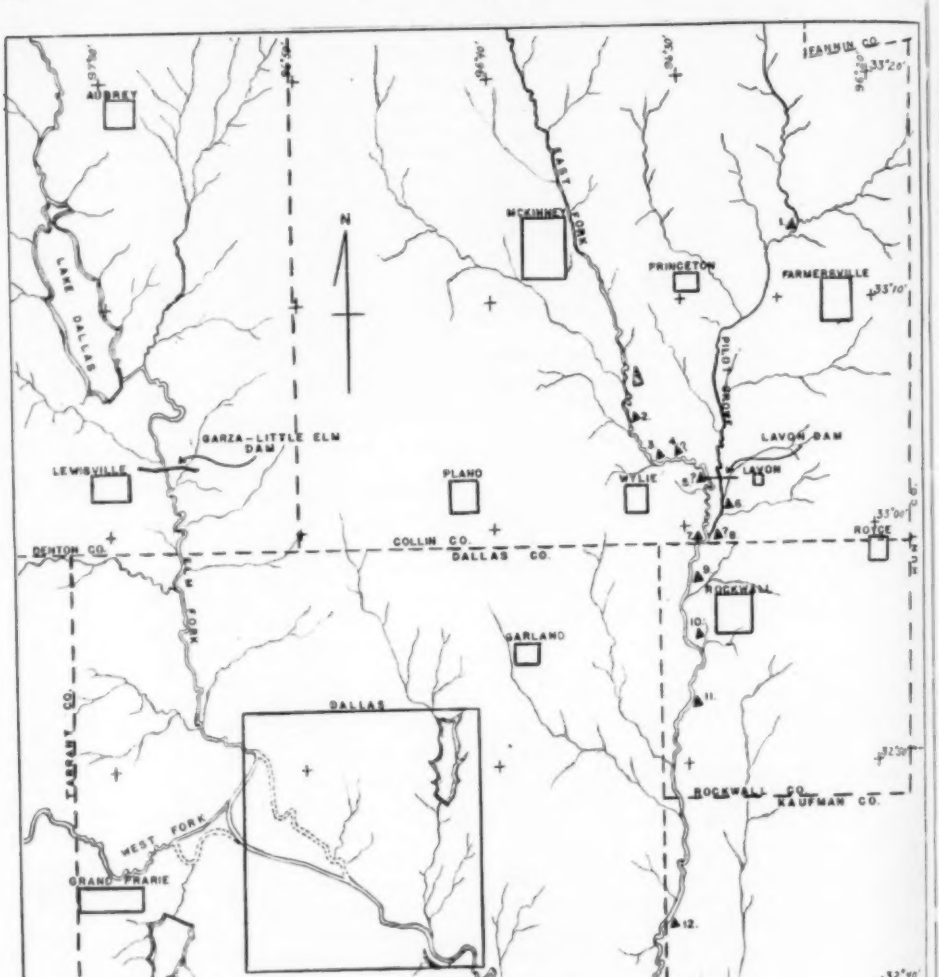

FIG. 91. Map showing East Fork of Trinity River.

THE HOGGE BRIDGE SITE

This site (41 18C9 1), one of the group of larger pottery sites on the East Fork containing a large circular pit, is located on the northeast side of that stream, 5½ miles by road northeast of the town of Wylie, and 2½ miles upstream from the Lavon Dam site. It will be completely inundated by waters of the Lavon Reservoir, and was selected for intensive excavation because it seemed to be a pure component of the culture it represents, and the various diagnostic traits of that culture seemed to be well represented.

Here the East Fork flows, in a large meandering bend, to the east and skirts a fragment of terrace of the old stream channel. The site is located on a portion of this terrace, covers 3 to 4 acres of it and is even now subject to erosion and deposition by seasonal inundation. The surface of the site is rather uneven due in part to this erosion and in part to a small fragment of a low natural ridge running from the upland to the river. A dense growth of vegetation covers most of the site but the central section of an acre or so was cleared in the 1880's and has been cultivated sporadically since. This cultivation has been a major factor in inducing erosion in this part of the site. The large circular pit is located in this cultivated area.

Surface collections have been made from this site by numerous individuals. The Dallas Archaeological Society over a period of years has excavated several test pits in the midden deposits of the site. In 1948 the River Basin Surveys excavated a test trench across the large circular pit. In 1950 the River Basin Surveys' field crew undertook more thorough excavations. The large circular pit was cross-trenched and 40% of its interior was excavated to the occupational surface of the pit. In several parts of the pit squares were excavated well into sterile soil beneath the occupational surface. A burial area was located and excavated in the east rim of the pit. Several 5-foot squares were excavated outside the pit and three deep strata squares were excavated, one inside the pit, one in the pit rim and one outside the pit.

The most obvious feature of the site is the large circular depression excavated into the sterile surface of the ground with the excavation waste from the center piled up around the circular rim. It is nearly a perfect circle 90 feet in diameter from rim crest to rim crest. Although erosion has reduced the height of the rim unevenly and it is now only from 2 feet to 4.5 feet above the normal surface of the site, present evidence implies that the rim was once of a rather uniform height of between 9 feet and 10 feet above the center of the pit. The interior of this pit sloped gradually toward the center to form a basin-shaped depression, rather than steeply to form a flat-bottomed depression. However, this gradual slope was broken by a sharper gradient toward the center, thus forming a secondary, deeper basin-shaped depression inside the larger one. The secondary depression was 25 feet in diameter and 2 feet deeper than the primary depression. The entire pit, as well as the rest of the site, is covered with a mantle of black topsoil ranging in depth from 54 inches in the pit center to only a few inches on the south and west rim.

Within the large circular pit, several smaller features were found. A lens shaped concentration of snail shells, 6 inches thick and 3 feet in diameter was located to the south of the pit center and on the floor of the small secondary depression. Snail shells occurred throughout the site but this was the only concentration found. A few flint chips and a scraper were associated with this feature. Along the south interior slope of the pit and at the occupational level were scattered several broken limestone rocks. These rocks had been burned red and fire-cracked and some ash and charcoal were found nearby. They were scattered over an area of 100 square feet, and not in position as they had been when used as hearthstones. A concentration of numerous similar rocks, but smaller and whiter in color was found 15 feet north of the scattered reddish rocks. These rocks covered an area of 10 square feet and did not appear to be burned but were on the occupational level. In the northern edge of the secondary depression of the pit a circular, vertical hole was found. This at first was thought to be a post mold but insofar as no others were found and it had a similar appearance to the many crayfish holes that occur in all areas of the site, it must be considered very doubtful as a post mold. Until some better evidence is presented, it must be assumed that a superstructure has not been shown to have existed in the pit. In the south interior slope of the pit, a few inches below the occupational level, a wolf (probably Red

A.

B.

FIG. 92. Excavations at the Hogge Bridge Site: *a*, view of large circular pit during excavation. Burial area is at upper left; *b*, burial area.

Wolf) burial was found. This young adult wolf was in an oval grave pit with no burial furniture. A large fragment of human skull cap was found in the western part of the secondary depression of the pit at the occupational level.

In the east rim of the pit the excavations uncovered a small burial area. Seven interments were found containing 13 individuals. Grave outlines were difficult and often impossible to determine, but could be partly delineated by the scarcity of caliche nodules within the grave fill. Graves A and B each contained a single adult of indeterminate sex. Grave C contained two adult males, an infant, a mature female, and an adolescent. Grave D contained two adults of indeterminate sex. Grave E contained a single adult male. Grave F contained an adult of indeterminate sex, and grave G contained two adults of indeterminate sex. All burials were flexed and without burial furniture although several deer bones were found in the fill of grave G. In grave C the five individuals were partly superimposed on each other and in grave A the two individuals were lying in reversed position to each other. All burials were within the yellow clay stratum but very near the surface of it. Burial 3 in grave C is the only possible exception and it slightly extended into the overlying black soil stratum. However, only the skull remained of this burial and it may have been partly uncovered by erosion prior to the deposition of the black soil, which would also account for the shallow depth of the other burials.

No cultural stratigraphy was apparent in this site. A single occupational level at the zone of contact between the overlying black fill and the basal yellow clay had as its aboriginal surface the top of the yellow clay. Nearly all of the artifacts were found from 2 inches below to 10 inches above this zone of contact. The materials found on the surface and in the upper levels of the black fill are the result of inverted stratigraphy resulting from erosion and subsequent deposition. Even though depths of artifacts range from 0 inches to 48 inches below surface, this reflects only the range in depth of the mantle of black fill that covers the site and not the depth below surface at the termination of occupation. Burials were intrusive into the yellow clay from this aboriginal surface. Midden deposits occur outside the large pit to the southwest, south, southeast and east. Thickness of these middens is from 12 inches to 24 inches but extending only a few inches into the yellow clay.

While cultural stratigraphy is lacking, natural stratigraphy is of real significance here. The deep strata-squares excavated in, on and around the large circular pit provided a good sequence of strata. Underlying the entire site is a basal foundation of a yellowish clay interspersed with horizontal zones of pea-size caliche nodules. Overlying this, at least in parts of the site, is a layer of fine, clean, yellow sand 1 foot thick. The sand is absent in the pit center but present in the rim. Overlying this is another stratum of yellowish clay with one or possibly two zones of caliche nodules. It is 1 foot thick. Above this the same clay continues upward some 5 feet (in the pit rim) but with the caliche nodules completely disarranged. Above the uppermost clay stratum is a surface mantle of a heavy black soil varying in thickness from an inch or two in badly eroded areas, to 54 inches in the pit center where recent deposition has occurred. It averages about 24 inches in thickness over most of the site. This natural stratigraphy presents a very complex problem of soil growth interrelated with erosion and deposition. However, the information at hand relates only to one site with no corroborative evidence from surrounding areas or other similar sites. Thus the interpretation of the significance of the soil strata will have to wait for further verification.

Potsherds (271) and chipped stone artifacts (313) constitute the bulk of the 644 artifacts from this site, though some bone, shell, antler, and ground stone artifacts were recovered. The potsherds represent a heterogeneous group of wares none of which occurs in sufficient quantity or percentage to be considered an indigenous type. Both shell tempered and clay-grit tempered wares are represented. Of the former, type Nocona Plain is dominant. This type is associated with the Henrietta focus (Krieger, 1946, p. 110). The 101 sherds of this type probably represent no more than 4 to 6 vessels, all are medium sized, simple bowls with flared rims. A second series of shell tempered sherds is light tan, soft in texture, poorly fired and of unknown shape, probably of medium size and thicker than Nocona Plain. The 22 sherds of this series probably represent no more than 1 or 2 vessels. The 148 clay-grit tempered sherds are of four

kinds. Type Monkstown Fingernail Punctated is represented by 56 sherds, all from 1 or 2 vessels of semi-cylindrical jar shape with slightly outcurving rim. This is a type associated with the Sanders focus (Krieger, 1946, p. 191). A single brushed sherd of a large vessel of an unknown Frankston focus type (Harris 1948a, 1948b; and Housewright, et al., 1948) and a single sherd of a small bottle of type Sanders Engraved of Sanders focus (Krieger, 1946, p. 190) were found. There are 89 sherds of a plain, thin, clay-grit tempered ware, with a soft, flaky surface probably representing 4 to 6 bottles with short cylindrical necks, and of approximately one quart capacity. These are of type Sanders Plain another Sanders focus type (Krieger, 1946, pp. 188-90). One small hemispherical bowl with notched lip; one small hemispherical bowl with bifurcated lip tabs; and 4 or 5 other small, simple bowls, are also of type Sanders Plain. Thus at least six kinds or types of pottery are represented in 271 sherds from 18 to 25 vessels. Cultural affiliations and chronological position of this pottery will be discussed below, together with that of the pottery from other components of this culture under the section "Chronological Position."

Projectile points are of both small arrow point types (66 specimens) and larger dart point types (72 specimens). Of the former, Alba Barbed type (Newell and Krieger, 1949, p. 161) predominates (26) with the unnamed triangular and sidenotched points second (21) and Perdiz Pointed Stem type (a type established by J. C. Kelley) third (7). Twelve were unidentifiable. Of the dart points, Gary Stemmed type (Newell and Krieger, 1949, pp. 164-6) is dominant (27); Ellis Stemmed type (Newell and Krieger, 1949, p. 166) is minor (5). Twelve specimens are untypable and twenty-eight are too fragmentary to be considered. Thus three projectile point types are dominant: the Gary Stemmed type; the Alba Barbed type and the unnamed triangular type. The former is elsewhere associated with pre-pottery and early pottery horizons (Krieger, 1946, p. 117). The latter two types are associated with such pottery cultures as Henrietta focus, and the foci of the Gibson aspect (Krieger, 1946, pp. 103, 115, 116).

Other chipped stone artifacts include small flake scrapers (68), triangular scrapers (30), ovoid scrapers (8), small snub-nosed scrapers (2), stemmed scrapers (1), gouges (1), small drills or awls (3), hammerstones (3), chipped quartz pebbles (2), and 57 indeterminate chipped pebbles that may be crude scrapers, rejects, cores or other refuse of artifact manufacture. The gouge is similar to those found elsewhere associated with non-pottery cultures (Kelley, 1947, pp. 99-100). The small snub-nose scrapers and the small drills are similar to those found in late pottery cultures both to the west and to the east of this area (Krieger, 1946, pp. 106, 114, 196, 212). The other chipped stone artifacts are so general in type that no cultural tie can be made to them.

Ground stone artifacts were rare and of no distinctive types. Three mano fragments, hematite pigment, and a boatstone fragment complete the list. The boatstone is perhaps of some significance in that boatstones are usually associated with the archaic and early pottery cultures to the east (Ford, 1936, pp. 87, 226).

Bone, shell and antler artifacts seem to be of importance here, though the quantity recovered is rather small (47). Shell is represented in an oval gorget fragment (undecorated) of conch shell and a disc bead of conch shell. Nine antler tines worked into flaking tools were found. Bone artifacts (36) included ulna flaking tools (7), long pins (3), short pins (10), awls (2), a fishhook, a beamer, a cut human tooth and 11 miscellaneous cut bones.

The excavations at the Hogge Bridge site warrant the following tentative conclusions: This was a moderate sized village occupied for an unknown period of time by a single group of people whose culture did not conform to that of any of the previously described cultures in nearby areas. Occupation of this particular site probably did not extend over any great length of time, judging by the thickness of the refuse deposits. Pottery was used by these people but none of the types seem to be indigenous, all probably being borrowed from neighboring groups. Vessel shapes are largely simple bowls and bottles all of moderately small size and with little decoration, thus implying use as practical utility items and not as elaborate embellishments of the culture. That the bow and arrow was used is indicated by the small projectile points. However, the large projectile points suggest the use of the atlatl contemporaneously. Projectile point types are similar to those elsewhere associated with the Henrietta focus to the west and with various foci of the Caddoan area to the east (Newell

and Krieger, 1949, pp. 161-72). Agriculture was practiced as is indicated by the grinding implements and some corn fragments. Burial customs included flexed burial, single and multiple interment and lack of burial furniture. Definite burial areas or cemeteries were utilized. Some possible animal worship is suggested by the burial of a wolf. The dominant feature of the site is a large circular pit of unknown use. The pit was apparently important to the village as its construction must have been a major project probably involving most of the members of the village. The whole culture represented at this site shows no elaboration or efflorescence. It is instead simple and utilitarian.

THE WYLIE FOCUS

The site just described represents one component of a distinct cultural complex on the western edge of the Caddoan area and on the eastern edge of the southern extension of the Plains area (Stephenson, 1950, pp. 152-6). The known components of this complex, which has been named the Wylie focus (Stephenson, 1949b, p. 59; 1950, pp. 154-6), are distributed along the East Fork of the Trinity River and one of its major tributaries, Pilot Grove Creek. They have an east-west dispersal of some 15 miles and a north-south dispersal of some 50 miles. It may be that additional components of this complex occur elsewhere, particularly along the many headwater branches of the Sabine and Sulphur rivers immediately to the east and along White Rock Creek in the city limits of Dallas, and also in parts of southeastern Dallas County. If so, these components have not been fully recognized as such and must await further investigation. Members of the Dallas Archaeological Society have located sites along these streams, which produce artifact assemblages resembling those of sites of the Wylie focus, but lacking pits and other features of that focus.

The known components of the Wylie focus are, proceeding downstream from the northernmost site: (1) Farmersville, (2) Branch, (3) Hogge Bridge, (4) Campbell Hole, (5) Site 41 18D7 5, (6) Thompson Lake, (7) Butler Hole, (8) Site 41 27B1 5, (9) Upper Rockwall, (10) Lower Rockwall, (11) Glen Hill, and (12) Gilkey Hill (Stephenson, 1949a, 1949b; Harris 1942, 1947, 1948a, 1948b, 1948c, 1948d; Housewright, et al., 1947, 1948; Wilson, 1941, 1946; Hanna and Harris, 1948; Sollberger and Harris, 1949). With the exception of the Hogge Bridge site, most of these are multiple component sites with the Wylie focus overlying one or more undefined, earlier components. Over half a hundred other archaeological sites are located in this same area, many of which also seem to be multiple component sites, but all appear to be somewhat earlier occupations than the Wylie focus and often are similar to the components underlying the Wylie focus in sites possessing that occupation.

This group of sites is established as a separate focus on the basis of several distinctive characteristics that seem to distinguish it from other known foci of this and surrounding areas. Most obvious and significant of these are the following: (1) Each site (with 3 possible exceptions) contains a single large circular pit with a built up rim. (2) Pottery, while fairly abundant, seems to be all trade material and no indigenous types appear to be present. (3) The burials are all flexed. (4) No complex of burial furniture occurs. (5) Burials are both single and multiple interments in poorly defined burial pits. (6) Artifacts of all types are consistently similar throughout all components and are reasonably distinctive, in total assemblage, from those of other foci of nearby areas, though some individual types are similar to those found in known foci. These characteristics will be included in the following description of the Wylie focus along with the less distinctive but nonetheless definitive characteristics of the focus. It is hoped that with the additional contemplated field work and excavation at three more of these sites, by the River Basin Surveys, additional distinctive and definitive characteristics of the Wylie focus will be brought to light, and that the characteristic included in this report will be further confirmed or denied. It is also hoped that a great deal more will be learned of the natural stratigraphy of the sites of this culture.

Agriculture was practiced by the Wylie focus people as is shown by fragments of corn recovered from the Campbell Hole, Hogge Bridge and Butler Hole sites. Less definite evidence of agriculture is seen in the manos and grinding slab type metates found in nearly all of the sites and the permanent nature of the villages, permanent houses, use of pottery and availability of good tillable land. It may also be pointed out that 7 bison scapula hoes

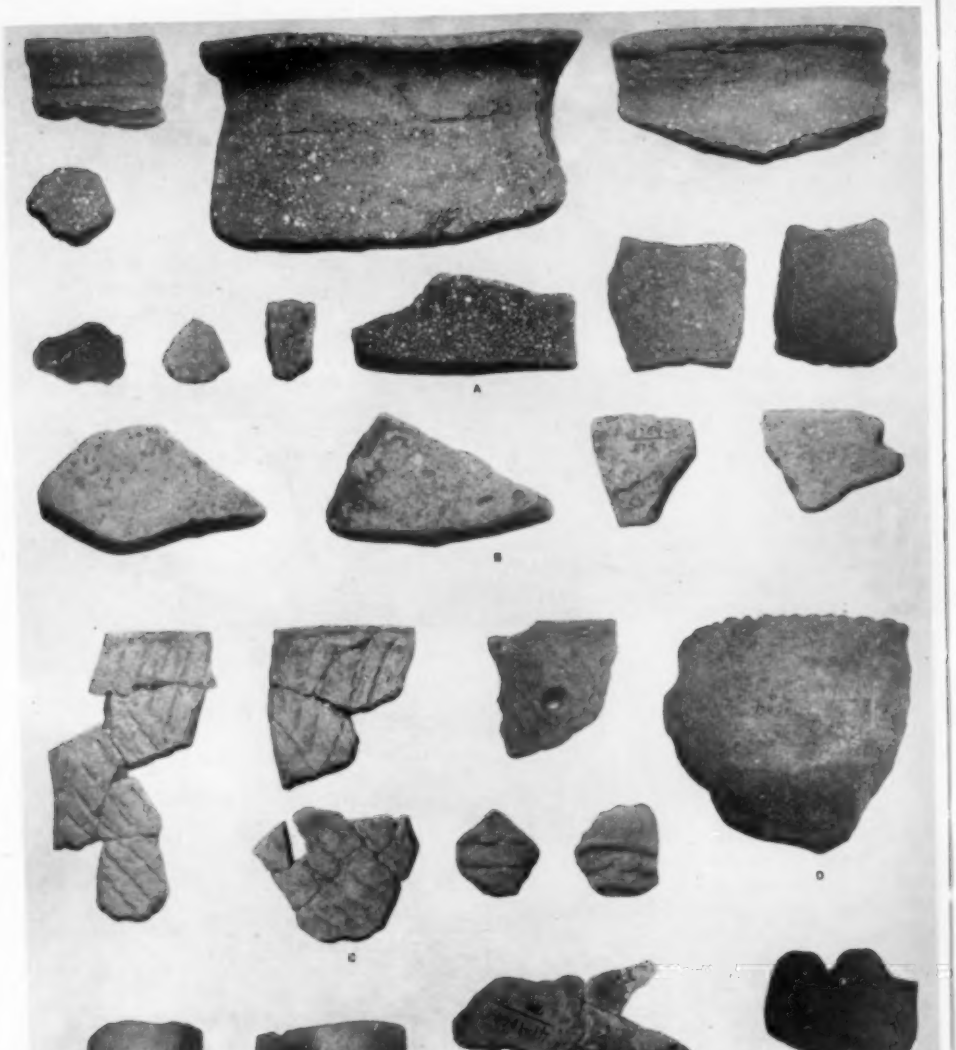

FIG. 93. Potsherds from Wylie Focus Sites (½ size). *a*, Ten sherds of Nocona Plain; *b*, four sherds of unnamed shell-tempered series; *c*, six sherds of Monkstown Fingernail Punctated; *d-g*, Sanders Plain; *h*, Sanders Engraved

(a type of agricultural implement associated with the Henrietta and Sanders foci) were found in a burial at the Farmersville site. This burial, with grave furniture, is aberrant here but does imply knowledge of the use of these implements. Hunting, fishing and gathering were certainly of importance in this culture. Bones of fish, amphibians and small game animals are numerous in the sites of this focus, as well as fragments of nuts and edible roots. Probably agriculture, hunting, fishing and gathering were all of importance here.

Villages were uniformly located along the lower terrace of a major stream channel and usually adjacent to and often within the normal flood area of the stream. They range in size from 3 or 4 acres to 12 or 15 acres. In most cases advantage was taken of a small, low ridge in a part of the village. The large circular pit is usually located on one side of this ridge and the rest of the village is deployed in no particular pattern (so far as is known) to one side or the other of the pit or occasionally surrounding the pit. However, as only one house has been excavated, the general village plan is not known. This one house in the Butler Hole site and one house that was bisected but not excavated in the Campbell Hole site give some idea of the house pattern. From this it is implied that houses were of wattle and daub construction, elliptical in shape and probably oriented in the cardinal directions. The Butler Hole house was 13 feet 7 inches by 10 feet 1 inch with the entrance probably on the long side facing south. The floor was of hard packed clay, 1 to 2 inches thick, well smoothed and possibly fire-hardened, though the latter may have resulted from burning of the house upon abandonment. One center post mold was found. Two empty cache pits, of small size, were located near the door. The Campbell Hole house seemed to conform to this same pattern and size insofar as was determinable.

The most outstanding feature of the sites of the Wylie focus is the large, circular pit in each site. In only 3 sites of this focus (Campbell Hole, site 41 18D75 and site 41 27B15) are these pits not apparent. In all probability the pits in these three sites have been destroyed by erosion or covered by deposition. The pit excavated in the Hogge Bridge site and described above should hold very well for this feature in all the sites. To summarize, they are approximately 90 feet in diameter, circular in shape, with the excavation spill from the interior thrown up around the edges to form a rim 8 to 10 feet high. The interior is concave, sloping gradually from the rim crest to a point near the center where the contour breaks more sharply downward forming a secondary, deeper depression in the pit center. The use of these pits is still unknown. Many possibilities have been suggested but none have been borne out by concrete evidence. Dance arenas, gaming arenas, ceremonial centers, or open air council chambers are all possibilities. Water storage does not seem likely as springs or good streams flow nearby and water in the pit dries up long before the stream does, also there is no evidence of water having stood with any permanence within the pit. Use as a defensive breastworks is another possibility. Wilbarger described similar pits near Waco used by the Waco Indians in 1829 as defensive structures (Wilbarger, 1889, p. 174). Possibly the rim and not the depression was the principal purpose of the structure, thus forming a "circular mound" with the borrow pit in the center. Wedel found circular pits in Kansas that were, in some respects, similar to these but with raised centers and superstructures arranged around the inside edge (Wedel, 1942, p. 4). A cemetery was found in the east rim of the Hogge Bridge pit but no structures were evident. Thus the real purpose of the pits is still in doubt and will have to await further work at other sites of this culture.

If it is assumed that the above mentioned pits are concerned in some way with a ceremonial complex it may be that ceremonialism was of considerable importance. Otherwise there is little to bear out an emphasis on any elaboration of a ceremonial complex. No burial furniture, funerary pottery, elaborately decorated ornaments, pipes or other artifacts of apparent ceremonial connection were found. A wolf burial in the interior slope of the pit at Hogge Bridge may imply some ceremonialism connected with animal worship.

Burials are both single and multiple interments, all flexed, and at least sometimes located in burial areas. No burial furniture normally accompanies the body. Though seven bison scapula hoes were found with one burial at the Farmersville site and ten bone and antler flaking tools with a burial at Butler Hole, these are exceptional. Cremations have been

FIG. 94. *a*, Bone, shell and antler artifacts of the Wylie focus (½ size); *b*, miscellaneous potsherds from Wylie focus sites (sherds ½ size, bottle ¼ size).

FIG. 95. Projectile points and drills of the Wylie focus (½ size): *a*, Gary Stemmed; *e*, Alba Barbed; *f*, Perdiz Pointed Stem.

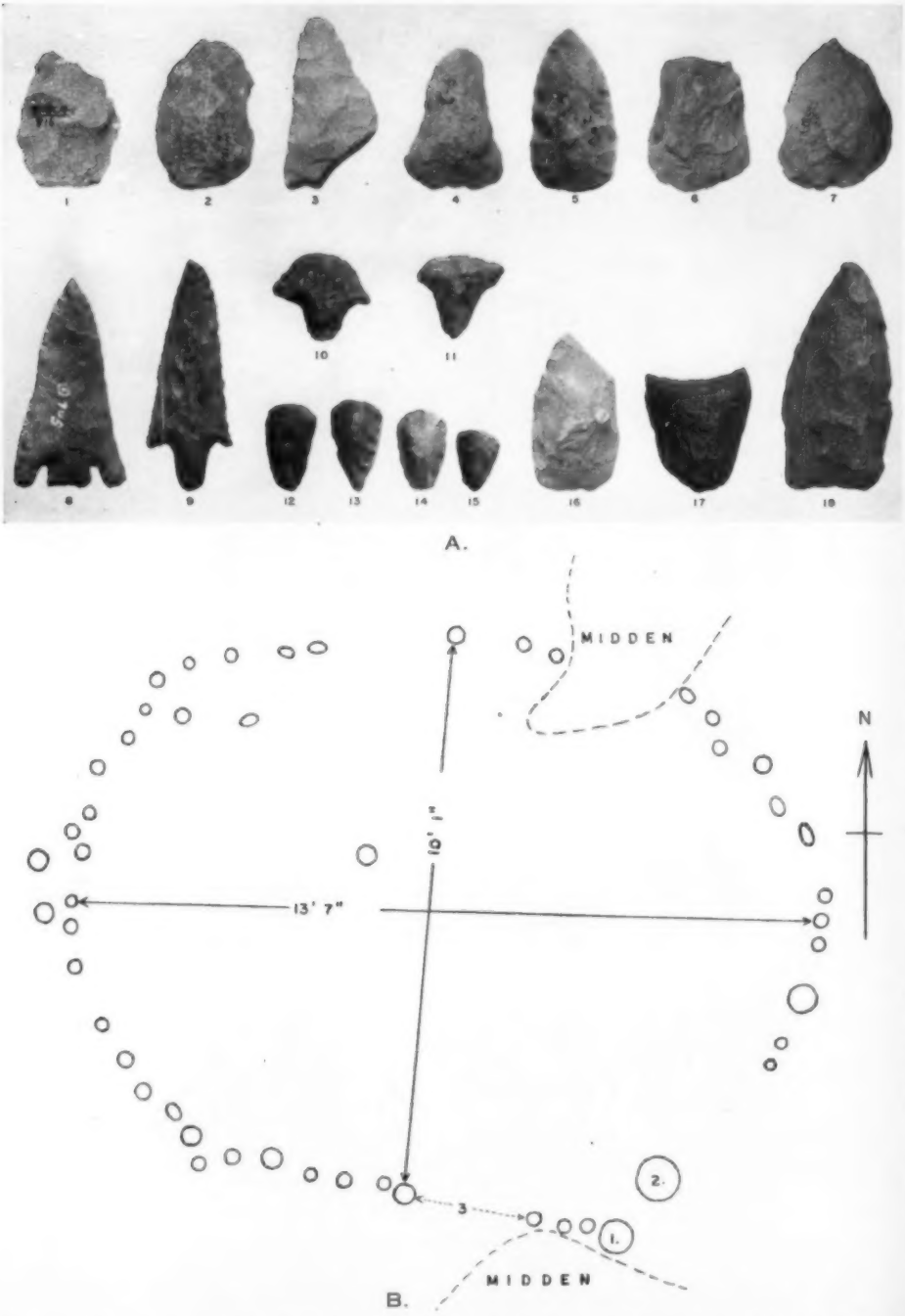

FIG. 96. *a*, Lithic material of the Wylie focus (½ size); *b*, plan of Butler Hole house (adapted from R. K. Harris). 1 and 2 are cache pits. 3 is probable entrance.

found at the Upper Rockwall site but these may or may not belong to the Wylie focus since this is a multiple component site and excavation has not been extensive enough to separate the components adequately.

The potsherds recovered from the Wylie focus sites are not in any case very abundant nor is there any indication that pottery was ever very abundant in any of these sites. This, together with the large number of different types included in the samples from each site with no single type being quantitatively important, implies that at least most of the pottery if not actually all of it may be considered trade ware. There seems to be no indigenous ware or type. Vessel shapes include small, simple bowls, water bottles and some wide-mouthed jars with recurved rims, all being medium to small in size. The sherds are about evenly divided between shell and clay-grit temper with some dominance of the latter. A few sherds are bone tempered and a few are limestone tempered. Shell tempered sherds are usually undecorated, but a few are brushed. Likewise, most of the clay-grit tempered sherds are undecorated but engraved, incised, brushed and punctated sherds of clay-grit tempered wares are found. The bone and limestone tempered sherds are rare but again are mostly undecorated. At least two of the limestone tempered sherds from the Farmersville site have basketry impressions on the vessel bottoms.

Evidence of use of the atlatl is found in a bone atlatl hook from the Farmersville site and in the many large projectile points. That the bow was also used is implied by the many small arrow points.

Scraping and cutting implements from these sites are of many types. Small, unshaped flint chips with one or more retouched edges (flake scrapers); broken projectile points reworked to a scraping edge (stemmed scrapers); and small, triangular, snub-nose scrapers are common. The heavy, crudely made scrapers range in shape from triangular to oval to circular and are numerous in all components of the Wylie focus. No large chopping implements are definitely associated with the Wylie focus nor are any celt or axes. Occasionally, moderately large knives, both stemmed and triangular, were used. Bone beamers found, also imply a use of bone tools for scraping and preparing hides.

Antler tines and deer ulnae were used for chipping stone implements and hammerstones were used for breaking flint nodules.

Some indication of sewing or punching and other preparation of skins is seen in the great quantities of bone pins. These pins are of three types: (1) long slender pins with no alteration on the proximal end (probably used as hair ornaments), (2) short pins without alteration on the proximal end (probably punching devices or awls), (3) short pins with grooves around the proximal end or with the proximal end ground to a flat spatulate shape (probably sewing implements, though not actual needles with eyes). Ulna awls were also used as well as small stone awls or drills.

The long bone pins mentioned above were probably used as hair ornaments. One undecorated, shell gorget was found in the Hogge Bridge site. Beads were used including tubular bird-bone beads of 1 to 2 inches in length, and disc beads of conch shell. One perforated bear tooth pendant was found in the Farmersville site.

Miscellaneous objects from various components of the Wylie focus include hematite pigment, sandstone polishing implements with longitudinal grooves, mussel shells with chipped edges, mussel shells with large holes drilled near the hinge, several chipped quartz crystals and a bone fish hook.

SUMMARY

The cultural affiliations and chronological position of the Wylie focus have not yet been brought into full view. There are, though, some rather indicative clues upon which speculation may be based. In none of the components has an indication of European contact been found. The focus may thus be assumed to be entirely prehistoric. We know that Moscoso traversed parts of northeastern Texas in 1542 but he probably left few articles of European manufacture. In the next century and a half some European articles must have penetrated the area by aboriginal trade. However, an "historic" period may be considered to begin with LaSalle's journey into northeastern Texas in 1687, following which prolonged French and Spanish activity enveloped the area (Swanton, 1942, pp. 29-52; 1946, pp. 56-81; Krieger, 1946, pp. 209-10, 245).

Trade pottery found through all components is of types associated elsewhere with at least three previously established foci. The type Nocona Plain is associated with the Henrietta focus to the west for which Krieger suggests a date between 1450 A.D. and 1600 A.D. (Krieger, 1946, p. 144). However, Witte, who has worked extensively in sites of this focus, suggests a date a century or so earlier and "perhaps in time it correlates with the Antelope Creek Focus" (personal communication from Adolph H. Witte of Henrietta, Texas, dated February 1, 1951). The types Monkstown Fingernail Punctated, Sanders Engraved and Sanders Plain, are associated with the Sanders focus to the northeast for which Krieger suggests a date between 1300 A.D. and 1400 A.D. (Krieger, 1946, p. 216). Some of the clay-grit tempered sherds appear to be of types associated with the Frankston focus to the east for which Krieger suggests a date from some time prior to 1500 A.D., extending into historic times (Krieger, 1946, pp. 205-12, 266-8), and developing into a fully historic Allen focus. The projectile points and other artifacts of the Wylie focus, offer, in general, little contradiction to the chronological implications that one may derive from the sherds. Nor do the site features, such as burials, houses, etc., offer any. It is hoped that when the natural stratigraphy is more fully understood, it will provide an important aid in dating this culture.

The Wylie focus, then, appears to be entirely prehistoric and to correlate in time with the Henrietta, Frankston and Sanders foci, at a time when both shell and clay-grit tempered pottery were in common use in northern Texas. Thus a beginning date of *circa* 1300 A.D. and a terminal date no later than 1600 A.D. may be tentatively assigned to the culture. Actually there is no indication that the Wylie focus embraced so long a time span and it may be that this period could well be compressed by a century in each direction. It must be pointed out, however, that this chronological placement is dependent primarily upon the position of the Henrietta, Sanders and Frankston foci. If, through Carbon 14 dating methods or as a result of more extensive work within these foci, their position needs readjusting, then the position of the Wylie focus must be readjusted correspondingly.

River Basin Surveys
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THE TURKEY BLUFF FOCUS OF THE FULTON ASPECT*

DONALD J. LEHMER

DESPITE the general lack of detailed reports on individual sites, the broad framework of the prehistory of eastern Oklahoma has been fairly well outlined in recent years. Orr (1946) presented a summary of the situation at the Spiro site. In the same year Krieger (1946) set up two aspects with a number of component foci which include the Spiro materials together with a majority of the other cultural manifestations in the area and in 1949 he amplified and partially revised sections of his earlier discussion (Newell and Krieger, 1949). Baerreis (1951) presents a significant body of data on preceramic horizons in the northeastern part of the state, and the recent paper by Bell and Baerreis (1951) summarizes most of the existing information on Oklahoma in general.

Although there appears to be a horizon broadly comparable to southeastern Archaic, the evidence for it in eastern Oklahoma is sporadic.

The summaries above point up the fact that the earliest period from which an adequate amount of material is available is the Gibson aspect. Made up of a series of foci which appear to represent both temporal and areal differences, the aspect is represented by relatively few sites, which appear to have been major population centers. Most of them contain either a temple or a burial mound or both. Round and rectangular houses occur in different foci. Burial is by single or multiple interment in an extended position. Pottery is elaborate, often highly polished with fine engraved designs, and has coarse clay temper. Shell temper is absent. The remainder of the artifact complex is comprised of a large number of items which might be described as "utility" pieces, together with others which show a considerable degree of elaboration. Copper was utilized in a variety of ways. Material assignable to the "Southern Cult" occurs in the Spiro and Sanders foci of the Gibson aspect.

The Fulton aspect follows Gibson in time. Except for a broad similarity in the ceramic tradition, there appears to be a sharp cultural break between the two manifestations. Fulton sites are comparatively small, and are much more numerous than those assigned to the Gibson aspect. Burial mounds appear to be completely lacking, and temple mounds are only found in the Belcher and McCurtain foci in the Big Bend area of the Red River. Some foci are characterized by round houses, others by rectangular structures. Burial is by single interment, except in the Belcher and McCurtain foci which occasionally have multiple interments. Despite the generalized similarities to the pottery of the preceding Gibson aspect, there is a general impression of a decrease in quality. Clay temper continues to be used in some districts, but shell tempering appears in the Fort Coffee and McCurtain foci, and to a lesser extent in the Belcher, Mid-Ouachita, and Texarkana foci. Other artifacts show a number of differences from the Gibson complex, the major trend being in the direction of a greater simplicity. "Cult" materials are lacking from the Fulton aspect, except for several engraved conch shells in Belcher focus materials. The Glendora and Allen foci show evidence of White contact; the others do not.

During the early spring of 1951, a River Basin Surveys party carried on a series of investigations in the Tenkiller Ferry Reservoir on the Illinois River, just south of the town of Tahlequah in eastern Oklahoma. Most of this work was done at the Cookson site (34CK12). Part of the material from this site provides the basis for the description of the Turkey Bluff focus, the remainder pertains to an earlier component which represents the complex to which most of the sites in the reservoir belong.

The Cookson site is located on the west side of the Illinois River in Sec. 15, T 14 N, R 22 E. It is approximately 15 miles south of Tahlequah. The site is situated on the flat top of a low terrace which fronts on an old channel of the river. Ground conditions and aerial photographs indicate that the river has shifted its course at least twice in order to reach its present bed some 500 yards southeast of the site. At the time of excavation, the village was furrowed from cultivation, and large parts of it had been heavily eroded.

In all, six houses, thirty-one cache pits, four graves, and two hearths were excavated. Stratigraphic evidence demonstrated that

* Prepared and submitted while the author was a member of the River Basin Surveys' staff.

there were two components at the site. Three of the houses and all of the cache pits can definitely be assigned to the late Turkey Bluff component; the hearths were unassignable; and the remaining houses and the graves belonged to the early component. The detailed analysis of the early material has been left to Robert Bell of the University of Oklahoma so it can be included with the results of his own work in other Tenkiller sites representing the same horizon.

On the basis of survey collections made by David J. Wenner, and the Cookson site excavations, this early horizon appears to represent a comparatively simple complex. The sites themselves tend to be small. Mounds of any sort appear to be absent. The little information available on the associated architecture indicates that houses were present at some sites, and that they were very similar to those which Orr illustrates for the Early Spiro component (Orr, 1946, Fig. 36*a*)—more or less square with four primary roof supports and a "trenched" entrance on the south side. Burials were single or multiple interments in a flexed position. Mortuary offerings were generally absent. Projectile points were large, heavy, percussion-flaked pieces, most of which fall within the range of Krieger's Gary and Ellis Stemmed types (Newell and Krieger, 1949, pp. 164-7). Other distinctive artifacts include percussion-flaked "picks" which are vaguely reminiscent of the European *coup-de-poing*, chipped slate hoes, percussion-flaked double bitted axes in the general form of a bow tie, pitted hand stones, unshaped one-faced manos, and metates with shallow oval basins. On the basis of surface collections, some of the sites representing this complex had no pottery. Others yielded a few clay tempered sherds, and more rarely grit tempered pieces.

The Tenkiller section of the Illinois valley lies within the western edge of the Cookson Hills. The valley itself is narrow, and bounded by steep, heavily wooded hills. The contemporary culture of the area is definitely marginal, and this same situation seems to have obtained in the past. Tenkiller sites belonging to the same complex as the early Cookson component appear to represent a pattern which is "Archaic" in its totality, but which has some traits, such as the square houses and the clay tempered sherds, which are characteristic of the middle horizons of the general area. Stratigraphic evidence demonstrates that this complex is earlier than one which can be assigned to the Fulton aspect. It is difficult to make any temporal equation with the Gibson and pre-Gibson horizons. However, it is my impression that the majority of the Tenkiller sites may represent a marginal survival of a basically "Archaic" complex, a survival into the period when the Gibson aspect was characteristic of the less isolated sections of southeastern Oklahoma and the adjacent parts of Texas, Arkansas, and Louisiana.

In contrasting the Fulton and Gibson aspects, Krieger writes:

> Compared with the later Fulton Aspect, the Gibson Aspect includes very few known sites. . . . In the earlier horizon each village was a center of economic and ceremonial activity; in the later one there were numerous small villages or camps of a few houses each, almost no mounds or centralized religious activities—in short, a decentralized existence (Newell and Krieger, 1949, p. 194).

This change seems to be reflected in the situation in the Tenkiller section of the Illinois River valley. Prior to Fulton aspect times, the culture of the district appears to have been a marginal one, characterized by the retention of traits which had previously gone out of fashion in the more sophisticated centers, and by the absence of the more elaborate items which distinguish the various complexes assigned to the Gibson aspect. This situation apparently changed radically during the period represented by the Fulton aspect, since the few late sites in the Tenkiller Ferry Reservoir conform closely to the Fulton pattern of other sections. They appear to represent an expansion of a new set of traits into an area which had been a cultural backwater during the earlier period when the population of the less isolated areas was concentrated into the spectacular Gibson centers.

On the basis of the Tenkiller survey collections and the material from the late component at the Cookson site, a trait list has been set up for the Turkey Bluff focus of the Fulton aspect.

STRUCTURAL COMPLEX

Mounds. Absent.

Houses. Rectangular; lengths from 23 to 28 feet, widths from 20 to 22 feet; long axis north-south; two primary roof supports set on long axis; wall posts set about two feet apart, heavy corner posts; tramped earth

floor; central basin-shaped fire pit, sometimes with a cylindrical hole at the center; "bench" across north end; one or more cache pits in floor; simple doorway entrance (?).

CACHE PITS. Undercut; round to oval; sometimes jar-shaped but generally in the form of a truncated cone; maximum diameters from 2.8 to 4.3 feet, minimum diameters from 2.4 to 3.7 feet; depths from 1.3 to 4.8 feet.

Straight-sided; round to oval; occasionally somewhat wider at the top than at the bottom; diameters from 2.5 to 4.0 feet; depths from 1.2 to 3.8 feet.

HEARTHS. *May associate with early component.* Located outside houses; roughly circular concentrations of heat-fractured stone with some ash and charcoal associated; usually only one layer thick; diameters range from 3 to 4.5 feet.

BURIAL COMPLEX

No data.

CERAMIC COMPLEX

A total of 1328 potsherds were found associated with the Turkey Bluff component at the Cookson site. Nearly all of them appear to belong to a single type which has the following characteristics:

PASTE. *Tempering*—medium to coarse plates of ground shell, often leached; *Texture*—medium to coarse; *Hardness*—2-3.5; *Color*—buff through reddish tan to brown, relatively frequent smoke blackening.

SURFACE FINISH. Smoothed but not polished.

DECORATION. Usually absent, six sherds had been decorated with deep furrowed incisions in straight-line patterns, four with shallow cuts across the lip.

FORM. *Lip*—usually rounded, occasionally flattened; *Rim*—same thickness as the body; usually flares sharply outward on jars, direct on bowls; bowl rims occasionally elaborated by a series of rounded tabs in the same plane as the vessel wall; two loop handles on jar rims; *Body*—globular jars, and bowls with flat bases and high, out-flaring sides.

Eight clay tempered and 11 grit tempered sherds were also found in Turkey Bluff contexts. The clay tempered pieces were presumably intrusive from the earlier component; the grit tempered pieces may have come from the earlier horizon, or have been trade pieces from complexes contemporary with the Turkey Bluff focus. Six of the latter were from bottles made of a hard-paste, polished, black ware with engraved designs. Red paint filled the engraving on one sherd.

GROUND STONE

CELTS. (2)

Elliptical and long elliptical; pecked bodies, polished blades; some battering on butt ends; lengths 102 and 132 mm.; widths 55 and 57 mm.; thickness 34 and 35 mm.

MANOS. (13)

Thin, shaped, short to long rectangular with rounded ends; 6 with two grinding faces, 7 with one; grinding faces range from flat to slightly convex on both axes; lengths 107 to 194 mm.; widths 93 to 116 mm.; thickness 27 to 43 mm.

METATES. (7)

Oval to sub-rectangular, unshaped or roughly shaped sandstone slabs; lengths up to 75 cm.; widths 30 to 60 cm.; basins range from shallow ovals to deep parallel-sided troughs with closed ends; all basins seem to indicate grinding with a back-and-forth mo-

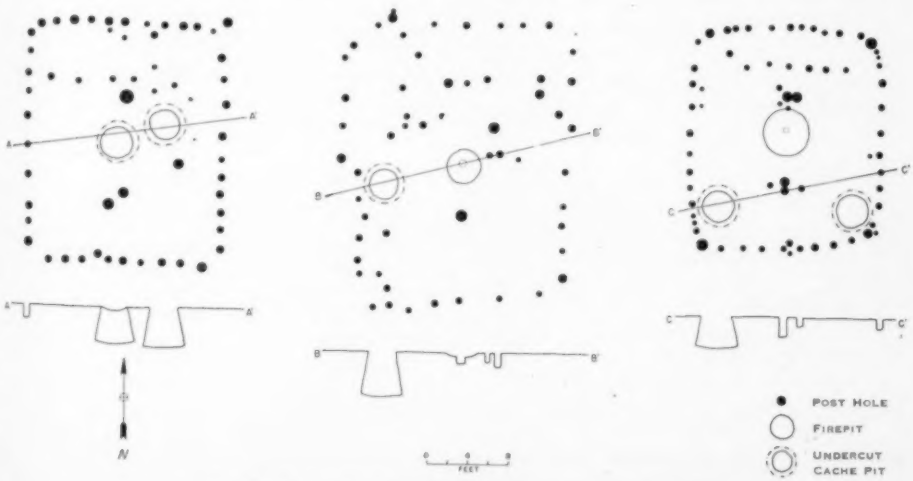

FIG. 97. Turkey Bluff component houses at the Cookson site.

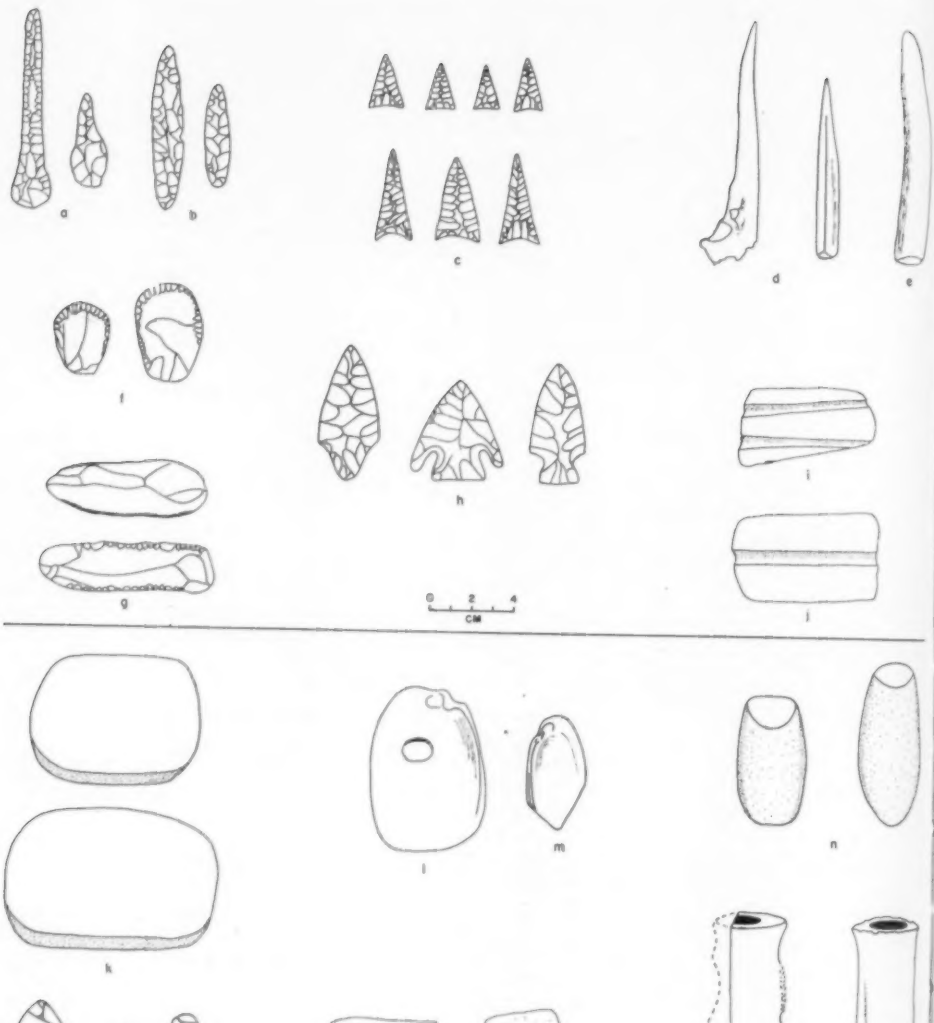

FIG. 98. Characteristic artifacts of the Turkey Bluff focus. *a*, expanded base drills; *b*, "ensiform drills"; *c*, arrow points; *d*, awls; *e*, punch; *f*, end scrapers; *g*, side scrapers; *h*, dart points; *i*, sharpening stone; *j*, shaft polisher; *k*, manos; *l*, shell hoe; *m*, shell scraper; *n*, celts; *o*, blades; *p*, pitted hand stones; *q*, scapula hoe; *r*, pick.

tion, the variation in shape apparently being a function of the depth of the basin; basin lengths up to 48 cm.; widths 20 to 30 cm.; depths 1 to 7 cm.

PITTED HAND STONES. (7)

Form ranges from tear-shaped to parallel-sided with one straight and one convex end; two flat faces, one or both of which have a single shallow pit near the center; pits range from 15 to 35 mm. in diameter and appear to have been finger rests; no battering to indicate use as a hammerstone, and no wear surfaces indicating use as manos. It seems likely that these tools were used for pounding some resilient substance such as dried meat in the preparation of pemmican.

PIPES. (2 bowl fragments)

The one piece large enough to permit observation is 45 mm. high with a maximum outside diameter of 26 mm. It appears to have been part of a platform pipe.

SHAFT POLISHERS. (3)

Rectangular blocks of coarse sandstone with a single groove; grooves run from one end of the block to the other, and are the same width and depth throughout; lengths 48 to 69 mm.; widths 26 to 43 mm.; thickness 13 to 25 mm.; groove width *ca.* 9 mm.

SHARPENING STONES. (8)

Irregular pieces of sandstone with several longitudinal grooves on the flat surfaces; individual grooves show considerable variation in width and depth, and often do not reach one end of the stone; lengths 46 to 81 mm.; widths 22 to 37 mm.; thickness 17 to 38 mm.; groove widths 0 to 17 mm.

CHIPPED STONE

ARROW POINTS. (29)

(23) Fine, thin, unnotched, straight-sided triangles with straight or slightly concave bases; lengths from 18 to 24 mm.; widths from 11 to 18 mm.; weights from 0.5 to 0.9 gm.

(6) Identical with others except for greater size and sometimes much greater convexity of the base; lengths 32 to 42 mm.; widths 16 to 22 mm.; weights 1.4 to 3.1 gm.

DART POINTS. (12)

Large, heavy, percussion-flaked points falling within the ranges of Krieger's *Gary Stemmed* (7); *Ellis Stemmed* (3); and Kelley's *Bulverde Barbed Blade* (2) types (Newell & Krieger, 1949, pp. 164, 166, and 170). There would seem to be some question as to whether these points were products of the Turkey Bluff component at the Cookson site or were accidental inclusions from the early component at the site.

BLADES. (18)

(11) Long, thin, proportionately narrow leaf blades; percussion flaked; lengths 129 to 140 mm. (2 whole specimens); widths 24 to 41 mm.; thickness 7 to 13 mm.

(7) Proportionately broad, thin, leaf blades; percussion flaked; lengths 92 to 148 mm.; widths 39 to 63 mm.; thickness 10 to 18 mm.

DRILLS. (5)

(2) Expanded bases; tapered or parallel-sided shank; rather blunt points; lengths 44 to 94 mm.

(3) "Ensiform drills"; tapered to one or both ends; lengths 49 to 78 mm.; widths 12 to 15 mm.; thickness 7 to 8 mm.

SCRAPERS. (12)

Side. (8)

Long, more or less parallel-sided to tear-shaped flakes; single flake scar on one face, multiple flake scars on opposite face; use-retouch on sides and occasionally on one end; lengths 49 to 82 mm.; widths 21 to 37 mm.; thickness 7 to 11 mm.

End. (4)

Thin, tear-shaped; single flake scar on one face, multiple flake scars on opposite face; pressure retouch on sides and blunt end; lengths 30 to 47 mm.; widths 22 to 33 mm.; thickness 5 to 8 mm.

HAMMERSTONES. (11)

Irregular to roughly spheroidal stones with one or more battered surfaces; diameters 40 to 78 mm.

CORES. (36)

Oval to irregular pieces of stone with heavy percussion flaking on both faces; maximum dimension 72 to 175 mm.

BONE AND ANTLER

AWLS. (9)

Ulnae of deer (1) and raccoon (1) with the proximal ends unmodified; distal ends removed; shaft worked to a point.

Splinters of deer (5) and bird (2) bone with blunt butts and sharp points; lengths 88 to 143 mm.

PUNCHES. (4)

Deer antler prongs; butt ends rounded; definite signs of wear on tips.

HOES. (9 fragments)

Bison scapulae with the scapula spine and posterior border removed; socketed through the glenoid fossa; socket diameters *ca.* 32 mm. It is interesting that these pieces show excessive amounts of wear, cutting edges often being well up toward the neck of the bone.

PICKS. (2)

A bison tibia and radius each socketed in the distal end; cut diagonally through the shaft near the proximal end to make a chisel-like working edge.

SCRAPERS. (1)

Half of a deer mandible, teeth *in situ*, with a very high polish; apparently lashed to a wooden handle and used as a scraper (?).

RASPS. (4 fragments)

Deer longbones (3) with grooves 2.5 mm. wide and 8 mm. apart cut across one or more faces; deer rib (1) with fine notches in the dorsal edge.

TUBES. (2)

Sections cut from the shafts of bird bones; lengths 25 and 93 mm.

PENDANTS. (1)

Right half mandible of Little Spotted Skunk drilled through coronoid process.

SHELL

HOES. (13)

Large freshwater mussel shells perforated with oval holes up to 30 mm. long; wear facets opposite valvar ends of shells.

SCRAPERS. (5)

Small freshwater mussel shells with diagonal wear facets opposite valvar ends of shells.

FAUNAL REMAINS

Unworked fragments identified as to species.

Animal: beaver (*Castor* sp.) –2; cottontail (*Sylvilagus* sp.) –11; deer (*Odocoileus* sp.) –135; muskrat (*Ondatra* sp.) –2; opossum (*Didelphis* sp.) –2; raccoon (*Procyon* sp.) –4; box turtle (*Terrapene* sp.) –86; soft shelled turtle (*Amyda* sp.) –3; turtle (*Pseudemys cooter*) –5. (Identification by Dr. Theodore E. White)

Bird: turkey (*Meleagris gallopavo*) –2; crow (*Corvus brachrhynchos*) –1. The crow bone is from a fully grown but immature individual. Dr. A. Wetmore, who made the identification, suggested the possibility that it was a pet.

Fish: freshwater drum (*Aplodinotus grunniens*) –1; ? (*Catostomidae* sp.) –1. (Identification by Mr. William T. Leapley, U.S. National Museum.)

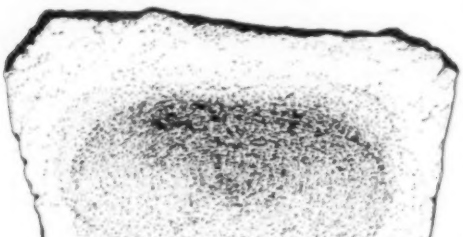

FIG. 99. Metate of the Turkey Bluff focus.

Freshwater mussels: *Fusconaia flava* (Rafinesque) –1; *Amblema costata* Rafinesque –3; *Amblema rariplicata* (Lamarck) –1; *Elliptio dilatatus* Rafinesque –2; *Tritigonia verrucosa* (Rafinesque) –2; *Cyclonaias tuberculata* (Rafinesque)? –1; *Lasmigona complanata* (Barnes) –3; *Alasmidonta marginata* (Say) –1; *Ptychobranchus clintonensis* Simpson –2; *Ligumia subrostrata* (Say) –5; *Ligumia ozarkensis* (Call)? –4; *Proptera capax* (Green) –1; *Proptera purpurata* (Say) –21; *Lampsilis ventricosa occidens* (Lea) –9. (Identification by Dr. Joseph P. E. Morrison, U.S. National Museum.)

The cultural complex represented by the late component at the Cookson site and by surface collections from similar sites in the area shows a number of similarities to Orr's Fort Coffee focus. There are also a number of differences between the two. They include the difference in orientation of the houses; the lack of an entrance passage and burned clay floors in the Cookson structures; the presence of undercut storage pits at the Cookson site; some differences in the pottery; the apparent absence of elbow pipes at the Cookson site; the absence of side-notched and small stemmed points, diamond bevel knives, and chipped slate hoes there; and the presence at the Cookson site of the bone picks, antler flaking tools, and deer jaw scrapers. The occurrence of long rectangular manos and of metates with troughs closed at both ends in Turkey Bluff contexts, tools which were apparently used with a back-and-forth grinding stroke, seems to be a distinctive trait for the area.

The similarities between the Fort Coffee and and the Cookson site material seem to be close enough to warrant placing the two complexes within the same aspect, but there seem to be enough differences to warrant placing the Cookson material in a separate focus. It has been assigned to the *Turkey Bluff focus* of the *Fulton aspect*. In a recent letter to the writer, Bell has suggested the possibility that the Searcy component of the Norman site on the Grand River in Wagoner County, Oklahoma (Bell and Baerreis, 1951) may also belong to the Turkey Bluff focus. The Searcy component consists of a series of burials intruded into an earlier mound. Hence, the material is not readily comparable to that from the Cookson site. However, there are enough similarities between the pottery and other artifacts from the Searcy graves and the Cookson site material to indicate a fairly close relationship.

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THE BOOGER BOTTOM MOUND: A FORSYTH PERIOD SITE IN HALL COUNTY, GEORGIA

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THE CORPS OF ENGINEERS is currently building a power and flood control dam near the little town of Buford on the upper Chattahoochee River in northern Georgia. This is one of several such dams under way in the State, and in accordance with the usual procedure the Smithsonian River Basin Surveys made a routine archaeological reconnaissance of the impoundment area from November 15, 1950 to April 7, 1951.* During the survey the writers came upon a large prehistoric mound (9HL64) not previously reported.

We spent three weeks investigating the structure to determine if its eventual flooding in the Buford impoundment would constitute an important loss of archaeological data. The conclusion reached was that a full scale excavation should be made before the site is inundated sometime in 1954 or 1955.

The explorations showed the mound to be one of the oldest artificial structures in Georgia; possibly even the oldest in all the southeastern United States. It differed from the hitherto recognized types of eastern mounds in that it was not accretional, was probably not for burial, nor did it seem to be a temple platform. What purpose it might have had is yet to be discovered, and the answer to this question may have an important bearing on the early development of mounds in this part of the country.

The unknown inhabitants of Booger Bottom many centuries ago possessed a culture which belonged to the archaeological stage called Burial Mound I by Ford and Willey (1941). Within this major stage, recognizable over a large part of the Southeast, the Booger Bottom site falls into a local interval we designate the Forsyth period, after adjacent Forsyth County, Georgia, where another representative site (9Fo50) was recently discovered. We regard the Forsyth period as occupying only the earlier part of the Burial Mound I stage and restricted to the north Georgia area, although perhaps closely related to sites in northwestern Alabama which show comparable pottery.

The chronology of north Georgia prehistory, only now becoming apparent, is based mainly on recent work in the Etowah Valley (Caldwell, 1950). Much remains to be done and doubtless additional chronological intervals will emerge. Table 11 shows the position of the Forsyth period in the present scheme. The evidence for its temporal position will be summarized later in this paper.

The Booger Bottom Mound stands in the bottomlands of a beautiful bend of the Chattahoochee River, on the Hall County side, within an extensive cattle ranch owned and operated by J. G. Whiting and C. B. Romberg. These gentlemen graciously permitted us to investigate, although the land had not yet been acquired by the Government. On the same side of the river immediately below the site is a small tributary valley, called Booger Bottom or Booger Hollow, where a minor gold rush once occurred. Somewhat more than a mile upstream is the crossing of the historic old Federal Road with the Vann House and the Summerour mound nearby (Goff, 1950).

Looking over the bottoms toward the river the mound appears as a grassy knoll astride a broad natural levee built long ago by the stream. Up the side of the rise marches a row of old trees along a former fence line leading to a river edge border of characteristically heavy growth: black walnut, oak, sycamore, and muskadine. In the short space between the mound and the river is a much later natural levee of pure white sand providing precarious support for a few small beeches and sycamores.

In addition to the mound, there are indications of aboriginal occupation of the main levee for several hundred feet in both directions. No pottery fragments or other debris have been found on the newer levee closer to the stream. In the bottomlands toward the hills away from the stream are some scattered cracked rocks but very few sherds.

At the present time the mound is oval in plan, 250 feet long by 200 feet wide, with a

*The Corps of Engineers gave every possible assistance to the Buford survey, and we particularly wish to thank Charles E. Jackson, Resident Engineer, and Francis F. Guscio of the Division Office in Atlanta for their wholehearted cooperation.

nearly level summit about 7 feet in elevation. The surface of the structure has been cultivated for many years and may be presumed to have once been higher. The margin is now about 75 feet from the river's edge and as this side gave every indication of having been cut back during high water, the mound was probably once more nearly circular than at present.

We decided to investigate by digging a trench 40 feet long by 5 feet wide, beginning at the side facing the river and proceeding toward the center of the mound. The profile thus exposed indicated that the immediate area had been occupied before the mound was built. This first habitation was represented by two superimposed occupation zones separated by a half foot or less of nearly sterile sand. Higher on the profile, examination showed that the mound itself had been built in two stages separated by a layer of occupational debris, sherds, cracked rocks, etc., in deposits of organically stained sand resting on the summit of the earlier stage. If a similar occupation layer was ever present on the summit of the upper mound stage it must have been ploughed away subsequent to the abandonment of the site by its original inhabitants.

During the excavations we found numerous fragments of broken pottery vessels and a number of other artifacts. The ceramics as a whole were markedly similar in form, decoration, paste, and other features. Most of the pottery had been decorated with a very fine and excellently executed check stamping reminiscent of the Deptford and Cartersville periods of Georgia and bearing a resemblance to Wright Check Stamped of northern Alabama. The frequent presence of a plain area above the shoulder on jar forms and the occurrence of tetrapod supports on vessel bases helped confirm the early position of this assemblage in the ceramic stratigraphy of the East.

Although there were two stages in the physical structure of the mound and two prepottery zones below, there was only slight evidence of ceramic change from the upper to lower levels.

Not so homogeneous were the adjacent areas outside the mound. A small test pit south of the mound on the old levee showed a dark zone of about one foot thickness overlaid by a foot of sterile silt. In the dark zone the usual check stamped sherds were associated with others which bore the type of decoration called simple stamped. Simple stamped sherds had been extremely rare in the mound and below it, so we interpreted their occurrence outside as an indication that they were later, i.e., deposited after the mound layers had already been formed. It seems probable that the simple stamped and check stamped sherds in the outside test pit were a true association for these two types are the major decorated components of the pottery of the succeeding Cartersville

TABLE 11. TENTATIVE CULTURE SEQUENCE FOR NORTH GEORGIA

		Northern Georgia					
	Atlantic Coast	Etowah Valley	Upper Chattahoochee	Central Georgia	Southwest Georgia	Eastern Tennessee	Northern Alabama
Burial Mound II Stage							
Burial Mound I Stage	Late Deptford	Cartersville		Early Swift Creek	Early Swift Creek	Candy Creek	Copena
	Deptford	Forsyth (Booger Bottom)			Deptford		Lu°63 Premound
Late Archaic Stage	Refuge	Kellog		Mossy Oak		Watts Bar	

period. A similar small test pit on the north side of the mound yielded a few potsherds belonging to one of the Etowah periods, perhaps Etowah I, and much later than the mound or even the simple stamped pottery.

The exploratory trench showed below the fill of the first mound stage two nearly horizontal strata, each one to three inches in thickness, composed of fired red and dark brown organically stained sand. These layers were marked by numerous sherds, broken quartzite pebbles, and other debris resulting from intensive occupation of the locality prior to the construction of the mound. The two layers were separated by a zone of about six inches of lighter brown sand. The lower zone especially showed many reddened areas where campfires had been built, and fire cracked and scorched quartzite pebbles were scattered all about. There was no evidence in our narrow trench of any prepared hearths or cooking pits, but we should not be surprised if the cracked rocks had been used in the practice of stone boiling, i. e., heating liquids by plunging hot stones in them.

Two irregular pits originating from the premound layers occurred near the outer end of the trench. The outermost (feature 4) is probably to be assigned to the lower zone. It was roughly 4 feet wide by 6 feet long by 18 inches deep. In the pit fill of dark brown sand were a few sherds, pebble fragments, and small pieces of charred wood. There was no evidence of burning on the sides or bottom of the pit and we were unable to decide for what purpose it might have been used. The other pit (feature 7) probably belonged to the upper premound zone. It was about 6 feet long by 30 inches wide by 36 inches deep. Like the other, it contained a few sherds and fragmented pebbles but showed no evidence of firing.

The primary stage of mound construction was viewed in the exploratory trench as a deposit of light tan sand with a level summit obtaining 2½ to 3 feet above the upper premound layer. The summit plateau was not everywhere as level as it appeared on the profile, however. In a small excavation made a few feet west of the trench we found that the first mound sloped steeply upward nearly two feet higher until it almost reached the elevation of the top of the second mound at this point. This suggested that the first mound, with a generally level plateaulike summit, was surmounted by a small conical eminence situated north of our trench rather than in what seems to be the present center of the mound. This feature should certainly be investigated at some future time, and might provide evidence concerning the purpose for which the mound was built. The profile in the long trench also indicated that the first mound stage may have had nearly as great a horizontal extent as that of the mound above, with the summit of the former intersecting the edge of the upper mound.

The light tan sand composing the first stage showed occasional horizontal streaks of darker soil. Actual basketloads could not be delineated, probably because the fill was very nearly all of one color and composition. Potsherds were rather infrequent.

On the summit of the first stage sherds were very numerous. They occurred along with cracked rock fragments in a general level of darker sand which marked the cessation of mound building and the formation of humus lines. In places this appeared as a single dark brown sandy layer 10 inches thick but elsewhere was represented by two or three vertically separate bands of organic stained sand each about one-half inch thick. While the number of sherds and cracked rocks on the summit of mound stage I implies that it was once an occupied surface, the soil lines at this level did not exhibit anything like the intensity of occupation which were observed in the premound layers. Moreover, we did not observe any areas of fired sand so characteristic of the lower zones. It is possible that the surface of the first mound was trod upon and received much of the normal litter of the contemporary inhabitants of the site but for some reason cooking fires were not habitually built there.

The secondary mound was constructed of sand somewhat darker than the fill of the stage below and in the exploratory trench it reached an elevation some one or two feet higher. As we have already indicated, recent cultivation has undoubtedly resulted in the loss of some of the original height and if there was a summit occupation zone as in the case of mound I, it has long since disappeared. The fill of the second stage contained many more sherds and rock fragments than the first, but the pottery assemblage showed little or no difference.

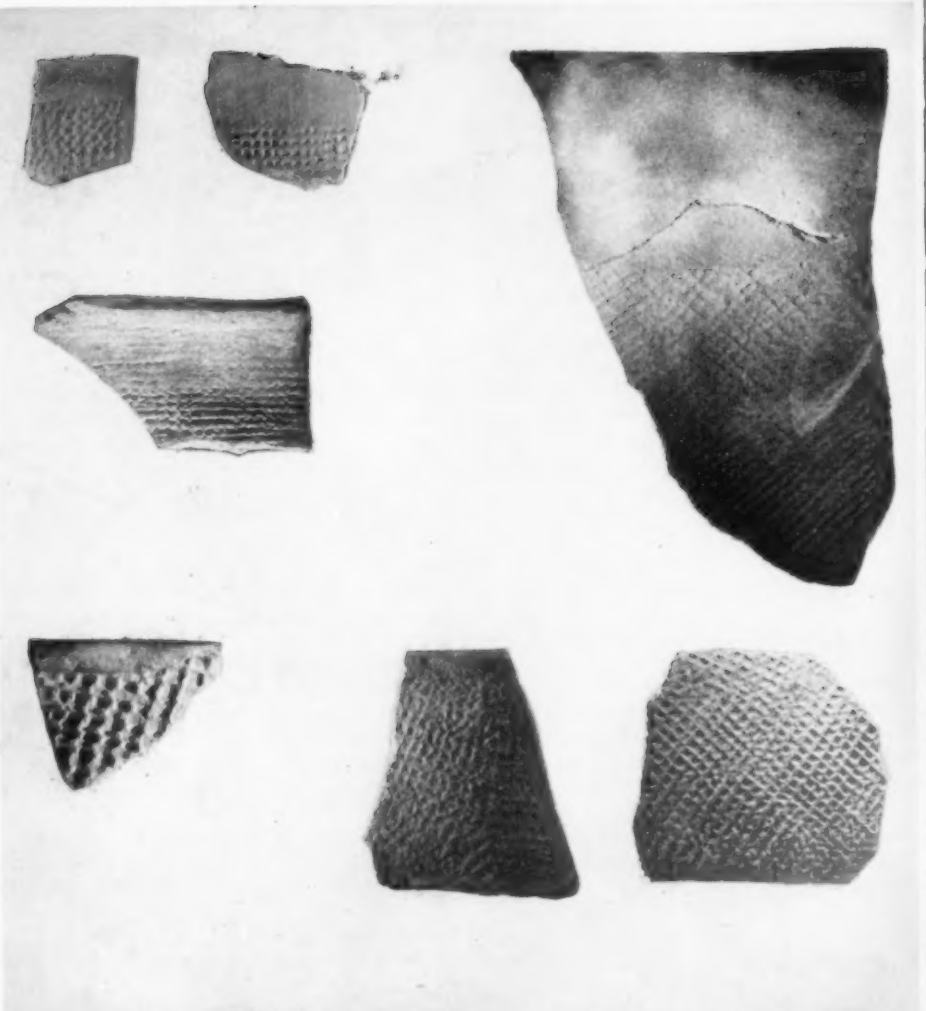

FIG. 100. Booger Bottom Checkstamped sherds.

The exploratory trench also disclosed the profile of a pit which was intrusive from the second mound stage or higher. This measured 4 by 3 feet by 4 feet deep and had relatively straight sides and a rounded bottom. The pit fill, somewhat darker than the surrounding sand, contained only a few sherds, flint artifacts, and cracked stones, all random inclusions offering no clue as to its purpose.

As earlier stated, several hundred potsherds were found in the course of the work. While there were no intact or even restorable vessels, the sample was adequate to enable us to recognize the more common vessel forms. The entire assemblage, both from the mound and premound levels, was relatively homogeneous and we judge that it belonged to a single complex made by a particular people during a specific, though as yet unknown, duration of time.

The pottery type Booger Bottom Checkstamped outnumbered all the other types together. The second most common type was Booger Bottom Linear Checkstamped and these two together comprised more than 80% of the entire assemblage. We are uncertain about the proportion of undecorated sherds. The checkstamped vessels often had a plain band below the rim and since an extraordinary proportion of the plain sherds were rim fragments, it appears that true plain pottery was rather infrequent at this site. A few true plain rather thick sherds are described below. It is likely that these were also a constituent of the Booger Bottom complex. Simple stamped, complicated stamped, and punctated sherds were all very infrequent. With the exception of one simple stamped sherd in the premound levels, all were in the summit debris of the first stage or higher. Little digging was done outside the mound, but test pits on each side yielded different and later ceramics.

BOOGER BOTTOM CHECKSTAMPED

(Fig. 100)

PASTE.

Method of manufacture: coiled. *Temper*: uncertain. The sherds have a slightly sandy feel and innumerable particles of fine sand are visible on the broken surfaces. Sand may have been added to the clay or an intentionally sandy clay may have been used; in any case, the sherds seem fairly consistent in this respect. No trace of limestone temper was noted in the sample. *Color*: surface colors derived from firing conditions and the constituents of the clay often vary somewhat over single sherds. For the most part the exterior and interior surfaces are approximately the same general color. Colors range dusty salmon, gray-buff, medium gray, black, and shades of brown and red. None of these colors are bright. The interior paste color is sometimes lighter or darker than the color of the surfaces.

SURFACE FINISH.

Invariably well finished with a good texture whether decorated or not, often showing tiny horizontal striations on the interiors, apparently marks of a scraping tool. The surfaces were almost never polished although well smoothed specimens are not infrequent.

DECORATION.

Technique: pottery vessels were stamped with a carved paddle before firing. The lines were intaglio in the paddle and consequently raised on the vessel surface. No specimens of pottery paddles have been found at any early pottery site in Georgia. If the paddles were of wood, they were too well finished to permit us to see any impressions of the grain.

Design: the entire exterior surface, or in many cases the exterior of the vessel from the base to the shoulder was covered with a grid of raised lines. Often a plain band was left above the shoulder and below the rim. About two-thirds of the sherds show a grid wherein the individual checks are nearly square; in the remainder the checks are somewhat rectangular. In most cases, also, the lands of one direction are slightly broader than their perpendiculars. This feature is constant on individual sherds and noticeable in about 95% of the whole group. This tendency ranges in prominence from sherds which might be confused with an intentional linear check motif to a barely perceptible difference. The prominence of lands for the whole group ranges from relatively broad (infrequent) to thin (frequent) and none are more than slightly elevated. The gross sample of sherds represents checks as small and fine as have been noted anywhere. In about 25% of the sherds the individual checks measure about 5.3 mm. on a side; in 50% they measure 3.4 mm., and in 25% it is 2.1 mm.

Execution: this is excellent, both in the carving of the paddles and in the stamping of the pottery. A number of sherds show exquisitely regular square checks with sharply delineated corners. Overstamping is not conspicuous in the collection.

FORM.

The most common vessel shape appears to have been a jar with a definite but not pronounced shoulder and a gracefully flaring rim. Several types of rim treatments have been noted ranging from carefully finished but otherwise unmodified specimens, to some with a slight outward extrusion resulting from the finishing of the lip, to others with small folded and rolled rims. Bottoms were rounded to conoidal or

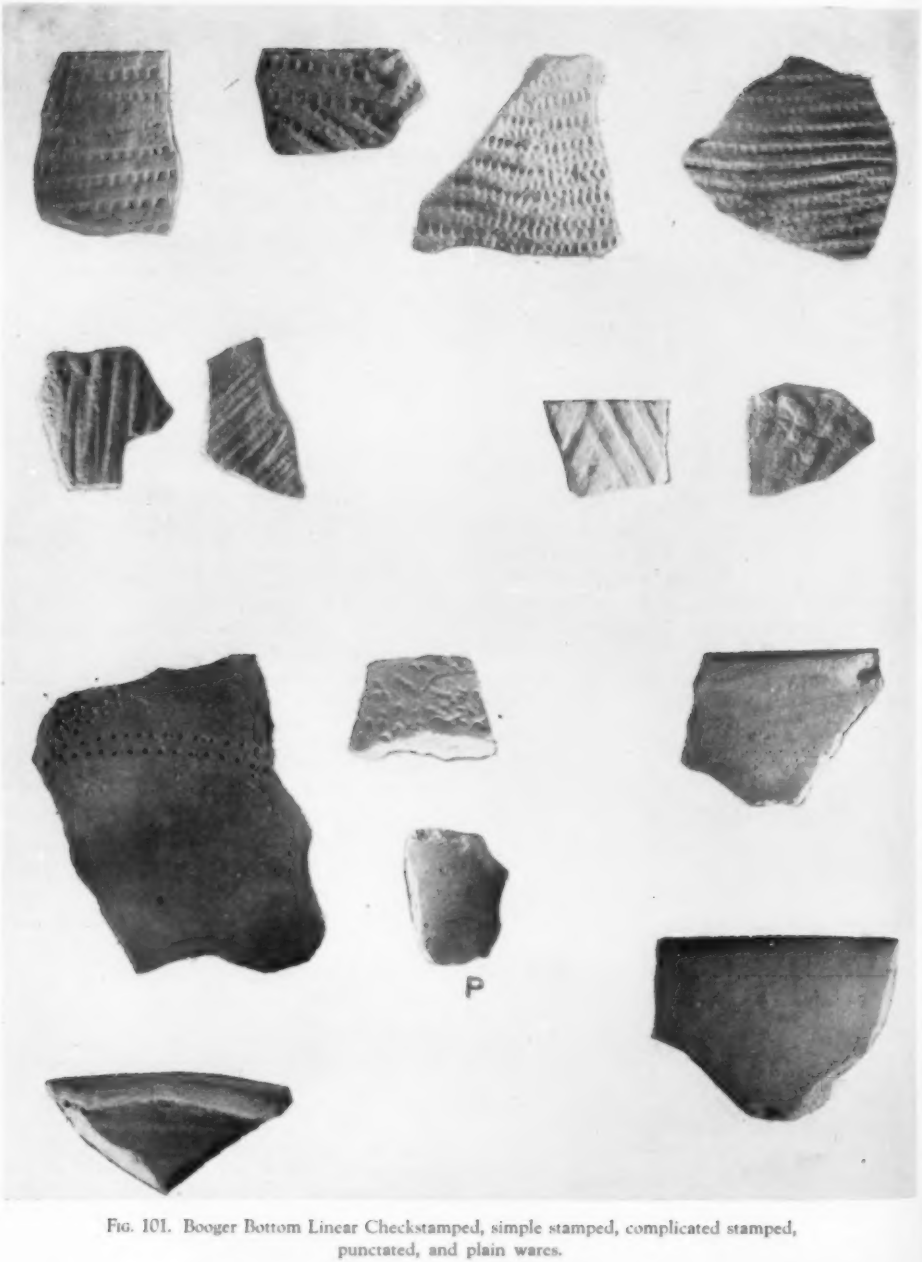

FIG. 101. Booger Bottom Linear Checkstamped, simple stamped, complicated stamped, punctated, and plain wares.

subrectangular, the last occurring only with tetrapod supports. Four teatlike supports were often affixed, or in some cases perhaps pulled out from the base. The supports may be large or small, thin or thick. All tetrapods were solid, but in a few cases the proximal end may be slightly concave or hollow, often depending upon the curvature of the vessel interior.

BOOGER BOTTOM LINEAR CHECKSTAMPED

(Fig. 101, top row)

(As far as we can determine at present, this type, and perhaps the *Simple Stamped* and *Complicated Stamped* types, were fairly similar if not identical to *Booger Bottom Checkstamped* in all respects except decoration.)

Technique: stamped with a carved paddle.
Design: a grid of raised lines with the lands in one direction far broader and generally higher than the transverse lines, somewhat resembling a series of parallel railroad tracks.

Execution: the carving of the paddle and the technique of applying it to the vessel were excellent. The designs are clear and precise with little evidence of overstamping.

SIMPLE STAMPED (Fig. 101, second row, left)

Sherds decorated or malleated with parallel impressed grooves were rare in the mound and nearly absent in the premound layers. The nature of the stamping tool is unknown. The grooves are exceptionally clear and precise.

COMPLICATED STAMPED (Fig. 101, second row, right)

Only two tiny fragments of complicated stamped pottery were found. Presumably the decoration was made with a carved wooden paddle. One sherd appears to have a portion of a straight line design, the other is probably curvilinear. Both were in deposits belonging to the second mound stage.

PUNCTATED (Fig. 101, third row, left)

Two sherds bearing portions of punctate designs were found in the second mound stage. The smaller shows a combination of punctates with an incised line. The larger has a part of a carefully executed punctate design on a well burnished sherd which is much thicker than the run of the pottery from this site, resembling the category of Thick Plain sherds.

RED PAINTED (Fig. 101, third row, P)

A small sherd painted red on both sides came from the upper premound zone. The curvature suggests that it might have been part of a tetrapod.

PLAIN

A number of thin plain sherds were found in all mound levels, a large proportion rim or shoulder pieces. Most of them are probably from the undecorated throat areas of Booger Bottom Checkstamped and Booger Bottom Linear Checkstamped vessels.

THICK PLAIN (Fig. 101, lower right corner)

Three burnished sherds were much thicker than most of the specimens from the site and had thickened angular rims 8–15 mm. through. Aside from decoration they resemble the thick burnished punctated sherd mentioned above.

Aside from sherds, the only pottery artifact found was a small modeled piece resembling a human lower leg. The proximal end was smoothed over; apparently this was not part of a complete human effigy.

A tubular bead of rolled sheet copper came from the fill of the second mound stage. It measured 18 mm. long by 6 mm. in diameter.

Several flint projectile points were found, all conforming to a single type: isosceles triangular with slightly concave bases occasionally "eared" at the basal corners. Identical points, believed to have been used as arrow tips rather than with spears, are the major chipped stone type of the Kellog and Cartersville periods. In the intrusive pit (feature 6) was a small, thick, triangular flint knife with a rounded base notched in the middle. There were two fragments of steatite two-hole bar gorgets, one from the summit deposit of mound stage I and the other coming from our own dirt pile. Such artifacts, supposedly ornaments, are characteristic of the Cartersville period. A fragment of a polished greenstone ax or celt lay in the summit layer of the first mound stage. From one of the premound levels came the bit of what had once been a large ax or hoe. All surfaces were rough except for a degree of wear along the cutting edge. The greater part of a circular pebble hammerstone of quartzite occurred in the fill of the second mound stage. In each of the two flat sides was a depression made for grasping between the thumb and forefinger. The battered rim of the tool showed that it had been much used before it was broken and discarded.

Ceramic differences among the Kellog, Forsyth, and Cartersville periods, together with the fact that the respective sites occupied the same geographical area of the Etowah and upper Chattahoochee drainages suggest that the three manifestations were not contemporary but followed each other in time.

Of these three, Kellog was first. Wauchope's stratigraphic work at Two Run and at other north Georgia sites showed Kellog ceramics at the bottom of his sequence, and the same situation was found by the Smithsonian at

9Br73. Kellog pottery is either plain or decorated by malleating with a cord-wrapped stick. In a few cases a similar effect may have been obtained by impressing the vessels with a fabric. Kellog Cordwrapped Stick Decorated is similar if not identical with Dunlap Fabric Marked of central Georgia, Long Branch Fabric Marked of northern Alabama, and with pottery associated with the Watts Bar focus of eastern Tennessee. Examination of Kellog period sites suggests a semi-sedentary hunting-gathering culture relying considerably on nuts and acorns. There was no evidence of maize in several score refuse pits checked by the Smithsonian at 9Ck62. The characteristic projectile points are small and stemless suggesting the first use of the bow and arrow in the region.

We define the Forsyth period as comprising sites and levels at which decorated pottery is almost all checkstamped. On the other hand, the Cartersville period is represented by sites where in addition to the checkstamped there are considerable amounts of plain sherds and potterv decorated by the simple stamp (Deptford type), the complicated stamp, and curiously enough, the cordwrapped stick. The main difference between the pottery of the Forsyth and Cartersville periods is in the proportions of the types composing the two complexes. Complicated stamped and simple stamped sherds do occur at the Forsyth period sites, but are rare. The checkstamped potteries of the two intervals are very much alike, but the Forsyth material at our disposal seems to have smaller checks and shows better execution. We are not sure at present whether to retain the name Booger Bottom Checkstamped for the Forsyth variety and Cartersville Checkstamped for the other.

The checkstamped material of both periods resembles the northern Alabama type Wright Checkstamped in most published particulars (Haag, 1939). The limestone tempering of the latter is not frequent in northern Georgia and our material does not show the added rim strip. The complete Cartersville pottery assemblage resembles the congerie of types found at the Wright site in northern Alabama and which Griffin considers to be Copena (Webb, 1945, p. 232). It is also similar to the assemblage representing the Candy Creek focus in eastern Tennessee.

Not only are the Forsyth and Cartersville periods ceramically related but they seem to have had much of their other material culture inventory in common. A semisedentary hunting and gathering culture is again suggested, projectile points were the same as in Kellog times, and the axes, possible hoes, and two-hole bar gorgets were similar. Small circular houses were found at two Cartersville sites, Two Run and 9Ck62.

The following is the evidence that the Forsyth period is earlier than Cartersville:

(1) Wauchope, in an article based on his work in northern Georgia, says:

> Deptford Check Stamped . . . judging from the surface collections was the prevalent pottery in this area during Late Archaic or early Burial Mound I times. Deptford Simple Stamped was the majority ware at other sites; these two Deptford types may have predominated during separate phases or by geographical areas during the same phase. The former seems more likely; of the two, check stamped was the first to appear. (Wauchope, 1948, pp. 201-9.)

(2) Wauchope's judgment was confirmed during the recent Smithsonian excavations in the Allatoona Reservoir. A large stratigraphic pit dug at 9Br73 showed first of all pure Kellog levels. These were followed by a checkstamped sherd bearing deposit, and then higher by layers with check, simple stamped, and complicated stamped sherds. The exclusively checkstamped layer we consider as belonging to the Forsyth period. The *melange* of check, simple stamped, and complicated stamped materials we define as Cartersville. While the situation was somewhat obscured by the circumstance that Kellog period sherds were found at all levels, we are inclined to think that so much of the original Kellog pottery was present that it continued to be scuffed up into the later occupational levels. This certainly must have been the case in the topmost layer of the pit where much Later Woodstock period pottery was found.

(3) At the Booger Bottom site a small test pit 100 feet north of the mound yielded a handful of sherds in which those with a simple stamped decoration outnumbered sherds decorated with the checkstamp. Below the mound, however, only one simple stamped sherd was associated with several hundred checkstamped. The simple stamped pottery outside the mound must have been later not to have been in-

corporated in the premound zone. In the mound itself, simple stamped pottery was rare but showed a slight increase in the occupation zone of the first stage.

(4) It appears that a similar situation is present in northern Alabama where a pure checkstamped deposit sealed below a Copena mound was reminiscent of a Forsyth period assemblage. The associated village site, presumably Copena, showed a pottery assemblage more like Cartersville.

> The dominant ware at the Copena Village site Lu'65 is limestone tempered. . . . This ware in northwestern Alabama has a rather long history and there are significant variations which are not yet fully appreciated in the proportion of the different types of surface finish from one site to another. These ceramic changes I presume reflect chronological changes. At this site Mulberry Creek Plain comprised 50.2% of the limestone tempered pottery; Wright Check Stamp 33.4%; Pickwick Complicated Stamp 5.8%; Long Branch Fabric Marked 5.4%; and Bluff Creek Simple Stamped 5.2%. At the nearby Copena mound Lu'63 a total of 143 limestone tempered sherds were found; 64 of them in the old village midden beneath the mound. Of these 41% were Mulberry Creek Plain and 59% were Wright Check Stamp. (Webb, 1945, p. 230.)

In conclusion it can be said that the Forsyth period belongs to the general time span which Ford and Willey called Burial Mound I. It appears to share most of its artifact types with the Cartersville period, which is later, and some with the Kellog period, which is earlier. It is partly contemporary with the Deptford period on the south Atlantic and Gulf Coasts, and probably with early Swift Creek in central Georgia. The writers have no firsthand knowledge of the comparable materials in northern Alabama and eastern Tennessee, but published data suggest that the Copena and Candy Creek manifestations in those regions are comparable to the Cartersville period in Georgia, which would make Forsyth somewhat earlier. In eastern Tennessee the Watts Bar focus is ceramically close to the Kellog period in Georgia and is thus somewhat earlier than Forsyth.

When Booger Bottom was occupied, southeastern cultures had been for some time emerging from the old Archaic horizon which had blanketed the East for some thousands of years. In this transition period we find incipient agriculture developing in the old hunting-gathering base; there is tobacco, well-made ceramics, circular houses, the bow and arrow, as well as other accouterments of a developing civilization. In some areas of the Southeast precocious peoples with an elaborate cult of the dead were beginning to build burial mounds.

At the Booger Bottom site we found no evidence of food remains aside from a few fragments of calcined bone. The inhabitants probably shared the general economy of their times, however, which is better known at the Kellog and Cartersville period sites in the Etowah drainage. We suppose that they were a semisedentary group, often hunting and fishing, but also gathering acorns and other nuts and seeds. Beans and other plants may have been cultivated as early as Kellog times, but whether maize had put in an appearance by the time of the Booger Bottom occupation is conjectural.

We found no evidence of houses or shelters although this was hardly to be expected in view of the limited amount of excavation. Circular houses are known from the Cartersville period, one found at site 9Ck62 in the Allatoona Basin was about 11 feet in diameter and contained a central rocklined fire basin.

In some lines of activity the people had generations of craftsmanship behind them, as in the practice of stone chipping which had been known for thousands of years. Their stonework was competent and appears to have been adequate to their needs. Projectile points, more specifically arrowheads, were standardized to a simple triangular form.

In the case of pottery making, a skill younger than stonework, but even by then of respectable antiquity, their thin-walled vessels were made with skill and care, although the paucity of vessel forms and lack of decorative variety again suggests inability or unwillingness to deviate from a norm. Although these people were probably contemporaries of early Swift Creek groups in central Georgia they showed hardly any tendency to copy the beautiful complicated stamped designs which were being made there. The Booger Bottom potters seem to have expressed themselves mainly in the neatness and care with which they carved and applied their checkstamped paddles. A considerable proportion of the grids are the smallest and finest that the writers have ever seen.

Our impression of the Booger Bottomers, derived principally from the lack of variety in their pottery and other artifacts, is that they were an unimaginative crew who played their cards close to the vest. This alleged simplicity of mind might reflect the general cultural level at that early time, but on the other hand, like any other people, it is probable that they devoted the greater part of their interest to matters which we do not find preserved in the ground.

While there is little we can say regarding their political and social development, it would be a mistake to underestimate its complexity. It was at least sufficient to enable them to build an extremely large artificial mound, a notable achievement and not directly connected with food getting. Whatever the purpose of the mound at Booger Bottom, it does not appear to have been a burial structure, although it is conceivable that burials might be found should additional digging be attempted. Nor can the elevation have developed through the simple accumulation of living debris, for it was made up of two artificial fills with an occupational level on the summit of the lower or first mound stage. There is the possibility that the mound might have been built to escape bottomland floods, but this does not seem reasonable because there was higher ground close by where they could have dwelled quite as satisfactorily.

A. R. and Rowena Kelly pointed out to the writers that the well known Swift Creek mound, which may be nearly contemporary with Booger Bottom, revealed a similar situation. Here in central Georgia was an artificial mound of the Burial Mound I Stage, but which was not a burial mound, and which did contain a series of occupation levels separated by sand fills.

Both the Swift Creek and Booger Bottom mounds long antedate the supposed appearance of temple or domiciliary mounds in North America, and in neither have we yet found any trace of a temple or other structure on the summit levels. More work will have to be done at these two sites and at any others which might be found before we shall have any certainty as to the purpose for which they were erected. The only suggestion which might be made at present is that the absence of summit structures would not preclude the possibility of ceremonies having been held on these elevations. An earthen platform without a summit structure would be a logical first step in the development of the eastern temple mound complex.

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THE FORT PIERRE BRANCH, CENTRAL SOUTH DAKOTA*

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DURING THE 1950 and 1951 seasons, field parties of the Missouri River Basin Survey carried on a series of excavations in the vicinity of the Oahe dam near Pierre, South Dakota. Most of the work was done at two earth lodge villages, the Dodd site (39ST30) and the Phillips Ranch site (39ST14). On the basis of the archaeological material from the Dodd and Phillips Ranch sites, and from a series of previously excavated sites located within a thirty-mile radius of the Dodd site, it seems possible to set up a sequence of cultural complexes for the area, complexes which follow one another in time and which appear to represent a series of modifications in and accretions to the earliest one known for the area.

The Dodd site, located on the west bank of the Missouri River about six miles upstream from Pierre, provides the basis for the chronological seriation of the material.

Three components were isolated at the Dodd site, components which appear to represent three different foci. The definition of the trait complexes of the individual components presented a number of problems. As must be the case in nearly all such stratified sites in the Plains, there had been some mixture of the archaeological material during the occupation of the site. The mixture resulted from digging cache and house pits, from refilling such excavations with trash, and presumably from covering the houses with earth which often contained refuse from earlier occupations. During the analysis of the specimen material, the various classes of pottery and other artifacts were first set up on a strictly typological basis. The resulting types were then grouped by applying a statistical test of association which related various artifact classes to the different styles of houses found at the site. The resulting trait complexes were then ordered in time on the basis of the numerous instances in which houses of one style were found superimposed upon houses of another and earlier style.

On the basis of this analysis, the complex assigned to the Monroe focus is the earliest one at the Dodd site. It was followed by the Anderson focus complex. There appears to have been a considerable time lapse between the Anderson horizon and the final occupation of the site, an occupation which has been assigned to the Stanley focus.

The Snake Butte focus has been set up to accommodate the material from the single component at the Phillips Ranch site, a village located about one mile downstream from the Dodd site.

There is a sufficiently large number of specific similarities between house and artifact types of the Stanley and Snake Butte foci to indicate that they fall close together in time. There is no stratigraphic demonstration of their relative age, but the internal evidence gives every indication that Snake Butte succeeded Stanley. This evidence includes the presence of horse bones at the Phillips Ranch site and their absence at the Dodd site; a marked increase in the proportion of contact materials at the Phillips Ranch site; and the differences in the associated trade beads. Glenn A. Black (personal communication) has identified Stanley focus beads as: ". . . an old type of Venetian trade bead . . . that could go well back into the 17th Century," and Phillips Ranch beads as "Venetian . . . found in early contact sites (1690-1750)."

Thus, the relative chronological positions of the Monroe, Anderson, and Stanley foci are established by house superposition at the Dodd site, and the Snake Butte focus appears to be subsequent to the Stanley focus because of an increase in the number of items indicating White contact.

The Monroe and Anderson foci are characterized by long-rectangular houses and by pottery with cord roughened bodies and flared or S-rims; the Stanley and Snake Butte foci are characterized by circular houses, pottery with simple stamped bodies and braced rims, and the presence of contact material. The superposition of the various architectural units at the Dodd site leaves no doubt as to the sequence there of Monroe followed by Anderson followed by Stanley. This sequence provides some excellent time markers for the Oahe area. Long-rectangular houses definitely preceded circular houses, and cord roughened pottery definitely preceded simple stamped pottery.

* Prepared and submitted while the author was a member of the River Basin Surveys' staff.

Using this trait sequence, it is possible to make a tentative chronological arrangement of the other sites which have been excavated in the area. The Thomas Riggs site (Meleen, 1949-b) is located on the east bank of the Missouri about 10 miles upstream from the Dodd site. The one house excavated there was a long-rectangular structure which, although considerably larger, showed a number of detailed similarities to the houses assigned to the Anderson focus at the Dodd site. However, the associated pottery is very different from the Anderson material. In describing it, Meleen says: "The surface finish on the body sherds is predominately smooth. Only a small number (7%) bear the impression of a grooved paddle. None has been treated with a cord-wrapped paddle" (Meleen, 1949-b, p. 317). The presence of the long-rectangular house indicates that the Thomas Riggs site is a relatively early one. The presence of simple stamping and the absence of cord roughening indicates that it is later than either the Monroe or Anderson foci, and it presumably succeeds them in time.

The next horizon appears to be represented by the Meyer site (Hoard, 1949) and the La Roche site (Meleen, 1948). Both villages are on the west bank of the Missouri, La Roche some 28 miles airline southeast of the Dodd site, Meyer some 25 miles airline north of Dodd. Both sites were characterized by circular houses which are similar to those assigned to the Stanley and Snake Butte foci. The associated pottery was predominately simple stamped. The presence of simple stamped pottery again indicates that these sites are later than the Monroe and Anderson foci; the presence of round houses indicates that they are later than the Thomas Riggs site. The absence of any contact material places the Meyer and La Roche sites as earlier than either the Stanley or Snake Butte foci.

Thus, for the Oahe area, the Monroe focus is the oldest. It is followed successively by the Anderson focus, the Thomas Riggs site, the Meyer and La Roche sites, the Stanley focus, and finally by the Snake Butte focus which is the latest. It might be argued that the differences between some of the sites are areal or cultural, rather than chronological. The first suggestion seems very unlikely in view of the fact that all four sites lie within a thirty-mile radius of the Dodd site. A suggestion that some of the sites represent contemporary occupations by groups with different cultural traditions seems equally unlikely because of the mutually exclusive distribution of specific pottery types. One would expect a certain amount of interchange by trade between contemporary neighboring groups.

Two other sites which have been excavated in the area may also be assigned to this series. On the basis of Meleen's brief summary (Meleen, 1949-a, p. 29) and Hurt's description of the pottery (Hurt, 1951), the Sommers site, located on the west bank of the Missouri River 20 or more miles below the Dodd site, seems to be another component of the Anderson focus. The Buffalo Pasture site, about a mile upstream from the Dodd site, was excavated in 1939 by a party under the joint sponsorship of Columbia University and the University of South Dakota. Strong's brief description of the results of the work (Strong, 1940), and the general nature of the site itself, indicate that it should be assigned to the Snake Butte focus. Two other sites which have been reported from the area are not included here. The Arzberger site is discussed below. The Robinson site (George, 1948) has been omitted since there are some indications that it may be a multicomponent village which would make it difficult to place on strictly typological grounds. There is, however, a possibility that it represents a horizon intermediate between Meyer-La Roche and the Stanley focus.

Having placed the excavated sites in the Oahe area in a chronological framework, it is possible to follow the changes of the various distinctive traits through time. The trait complexes for the Monroe, Anderson, Stanley and Snake Butte foci are based on items assigned to the three components at the Dodd site and on those found at the Phillips Ranch site. The total body of material includes 21 houses and 72 cache pits excavated at the Dodd site, 10 houses and 107 cache pits at the Phillips Ranch site, and a total of over 30,000 potsherds and 5,000 other artifacts from the two sites. Traits assigned to the other components are derived from the published reports and from an examination of the collections housed at the Museum of the University of South Dakota.

Most of the artifact groups from the Dodd site showed a positive statistical association with one or two of the three components. A few only showed a positive association with the

two early occupations represented by Monroe and Anderson components combined. These have been shown on the boundary between the two foci in Figure 102. A residual series of artifacts was represented by so few specimens which were so widely scattered through the site that it was impossible to demonstrate an association between them and any of the components at the site. The unassigned artifact groups from the Dodd site include bone tubes, drills, full-grooved mauls, hammerstones, hide grainers, rubbing stones, scoria sharpening stones, stemmed knives, and whetstones.

The Anderson and Monroe components at the Dodd site were confined to the top of a ridge which was bounded on the sides by rather deep gullies and which ended abruptly at the river. A fortification ditch had been dug across the narrowest part of the ridge, a ditch which bounded the area of occupation away from the river. The upper part of the ditch fill was almost sterile. The sherd count from the lowest two feet correlated with the proportions established for the Anderson focus. The sherd material indicates that the ditch dates from the Anderson occupation of the site, and it appears that fortification ditches are characteristic of the Anderson focus, but are not associated with the Monroe or Stanley foci. Meleen describes the Thomas Riggs site as lacking surface evidence of fortifications (Meleen, 1949-b, p. 313), and there was no evidence of fortification at the Meyer and La Roche sites. However, both the Phillips Ranch and the Buffalo Pasture sites are surrounded by fortification ditches which indicate a second period of unrest in the area. Contact materials from the Snake Butte focus indicate that it dates from the mid-18th Century, and the Snake Butte fortifications may well be a reflection of the pressure exerted on the sedentary villagers of the area by the dynamic emergence of the horse nomads.

Villages of the Anderson and Monroe foci are characterized by an arrangement of the houses in more or less regular rows. The Thomas Riggs site houses do not appear to be placed according to any particular plan, and the Meyer and La Roche sites are also characterized by an irregular grouping of the house pits. The Stanley and Snake Butte villages are also characterized by irregular layouts, but the houses are grouped around one large central structure which, from the presence of an altar, appears to have had some special function analogous to that of the historic Arikara ceremonial lodge. The Snake Butte villages were further distinguished by the fact that the houses were set quite close to each other inside the fortification ditch.

The Monroe and Anderson houses were rectangular, and were almost always over one and a half times as long as they were wide. The entrance was located in the south end, and consisted of an ante-chamber outside the house pit and an earth step inside the pit itself. The wall posts of the Monroe houses were distributed evenly around all four sides of the pit floor, while the great majority of the wall posts of the Anderson houses were located along the long sides of the house pit. Two of the Anderson focus houses had a low bench surrounding the central part of the floor. The single house excavated at the Thomas Riggs site is larger than any of those at the Dodd site, but it is otherwise very similar to them, in the details of the entrance, location of the post holes, and in having had a bench surrounding three sides of the floor. The houses from the Meyer and La Roche sites and from the Stanley and Snake Butte foci present a sharp contrast to those of the earlier horizons. All of these structures are circular, with four primary roof supports grouped around a central fireplace, and a covered entrance passage which generally faces east. There are minor differences in the details of the individual structures, but all of them conform to this basic pattern.

It appears that there are two basic architectural traditions represented in the Oahe area, with the change in house type coming between the period represented by the Thomas Riggs site and the period represented by the Meyer and La Roche sites.

There are also marked differences between the styles of pottery which are associated with the various house types (Lehmer, 1951). Monroe and Anderson vessels have predominately cord roughened exteriors. Vessels from the Thomas Riggs site and subsequent periods have plain or simple stamped bodies, and cord roughening appears to be completely lacking. The change from cord roughening to simple stamping comes between the Anderson focus and the horizon represented by the Thomas Riggs site, thus appearing one stage earlier than the change in house type.

Rim form and decoration also show a series of changes. Monroe and Anderson vessels are characterized by flared or S-rims. The S-rims of the earlier focus are mainly decorated with a series of horizontal incisions on the bulge of the rim, a treatment which is largely replaced by horizontal cord impressions in the Anderson focus. The flared rims are either undecorated or decorated with a series of tool impressions in the angle between the lip and rim. S-rims from the Thomas Riggs site are decorated with horizontal cord impressed or broad-trailed lines, both treatments being interrupted by two or more triangles which have their apexes below small lug-like nodes on the lip. Thomas Riggs flared rims are decorated with a punctate ridge several millimeters below the lip or with punctations in the angle between the lip and rim. The latter treatment is identical with that applied to the flared rims of the Anderson and Monroe foci. However, the Thomas Riggs vessels have plain or simple stamped bodies rather than the cord roughened ones of the earlier pieces. Direct rims make their first appearance at the Riggs site, although they are relatively scarce there. They are decorated with diagonal tool impressions on the lip, impressions which were made with the tool held vertically rather than at an angle. S-rims carry over into the Meyer-La Roche horizon. They are decorated with opposed triangular areas filled with diagonal broad-trailed lines. Flared rims are absent, being replaced by direct rims which first appeared in the preceding horizon. The lips of the direct-rim vessels are again decorated with diagonal tool impressions or with herringbone patterns. Rims are either simple stamped or decorated with a series of horizontal broad-trailed lines. The majority of the lips from this horizon are the same thickness as the vessel wall. The remainder are either slightly thickened as a result of making the decorative impressions, or more markedly thickened by finger pressure. A number of these lips are thickened to the point that they are similar to and seem to foreshadow the braced rims which are characteristic of the great majority of the Stanley and Snake Butte types. The Stanley and Snake Butte pottery is characterized by the virtual disappearance of all of the earlier rim forms. Nearly all of the vessels had braced rims, made by adding a fillet of clay to the exterior of the neck. The Stanley and Snake Butte types are also distinguished by the appearance of vertical brushing or scoring on the neck. Decoration consists of both cord impressed and tool impressed patterns.

The most distinctive change in the Oahe pottery is from cord roughened to simple stamped bodies, a change which occurs between the Anderson focus and the Thomas Riggs horizon. Rim form and decoration undergo a considerable number of changes from early to late times, but they show carry-overs from one period to the next which make it difficult to point to any sharp break in the continuum.

There are a number of changes in the artifacts of stone, bone, and other materials from early to late times. Contact pieces, represented by metal and glass, are entirely lacking in the early contexts. They appear first in the Stanley focus, and become proportionately more common in the Snake Butte focus. Projectile points from the Monroe and Anderson foci include both stemmed and unstemmed forms with convex sides, and these types appear to last on through the end of the Meyer-La Roche period. They are replaced by plain or side-notched triangles which are characteristic of the Stanley and Snake Butte foci. Monroe and Anderson knives are pressure-flaked, asymmetrical leaf blades, and this type persists to the end of the Meyer-La Roche period. A new type of knife appears at the Thomas Riggs site, a geometrical chalcedony plate chipped along one edge. This form continues through the Snake Butte focus. A third type of knife appears at the Meyer and La Roche sites, a percussion-flaked triangle which appears to replace the older leaf blades during Stanley and Snake Butte times. The latter foci are also distinguished by the appearance of iron and brass blades hafted in the slit edges of the ventral ends of bison ribs. There is a marked difference in the end scrapers from the early and late periods. The strongly plano-convex "snub-nose" and the thinner "thumb-nail" forms are present in all periods. However, those from the Monroe and Anderson contexts are relatively small, and are very regularly and evenly flaked. These forms last on through the Meyer-La Roche period. A larger form, characterized by percussion flaking over all of the convex surface except for the working edge, makes its appearance at the Thomas Riggs site. The two types of scrapers are both present in the Thomas Riggs and the Meyer-

La Roche horizons, but the small well-made variety disappears by the beginning of the Stanley focus. In this connection, it should be noted that objects which appear to be scraper hafts are present in the early horizons, but are not found in the later contexts. The hafts are made from bison ribs and have sockets in the dorsal ends, shaped to accept the pointed ends of the small scrapers.

There are also marked differences in the raw materials used for making the chipped stone artifacts. The great majority of the chipped stone from the Monroe and Anderson foci is a dark caramel-colored cherty chalcedony locally called "Knife River Flint." Tools of this material become increasingly scarce through the succeeding horizons, while the use of chert and red and yellow jasper becomes more and more common. Catlinite seems to make its first appearance in the area during the Meyer-La Roche horizon, and its use continues through Snake Butte times.

Pecked and ground stone artifacts are in the minority throughout the entire sequence. No stone grinding tools have been found. To date, celts are only known from the Anderson focus and the Thomas Riggs site. Sandstone shaft grinders from the early horizons are long, and there are some indications that they were used in pairs. Beginning with the Stanley focus, they are replaced by short pieces with a slight convexity of the grooved surface which seems to rule out any possibility of use in pairs. In this connection, the drilled bison ribs often classified as shaft wrenches seem to appear first in the Meyer-La Roche horizon and continue into the Stanley and Snake Butte foci.

Differences are also apparent in other bone artifacts. The glenoid fossa is left on the scapula hoes from Monroe through Meyer-La Roche times. The majority of the hoes from the Stanley and Snake Butte foci were chopped through at the neck to remove the glenoid fossa. Heavy "picks" made by cutting diagonally through a bison long bone are found in the Anderson focus and at the Thomas Riggs site. Flat pieces of bone split from bison ribs and rounded at the ends, pieces which were probably used to flatten porcupine quills, seem to occur in small numbers in all horizons, but are extremely common in the Monroe and Anderson complexes. Early and late fleshers are in sharp contrast to each other. Those from early contexts are made by splitting bison metapodials longitudinally through the head and shaft of the bone. Fleshers have not been reported from the Meyer-La Roche horizon. The fleshers from Stanley and Snake Butte contexts were made by cutting diagonally through the shaft of the metatarsus, and leaving the proximal end intact. In most cases the tarsal bones seem to have been left articulated for additional leverage. Toothed cutting edges seem to be confined to fleshers of this type. Bone knives with hooked ends, possibly for cutting squash, seem to be confined to the Monroe focus. Scrapers made from the sides of the superior ends of bison scapulae are found from Monroe through Meyer-La Roche times, but seem to disappear at the beginning of Stanley focus times. At this stage of the analysis it is impossible to make any definitive statements regarding the distribution of the several types of bone awls and punches.

In addition to the changes in house type and artifacts, there appears to have been a marked change in the importance of hunting from early to late times. A count of all of the fragments of animal bone found at the Dodd site showed a mean of 29.2 fragments per cubic yard of house fill in the Monroe focus, 13.3 pieces per cubic yard in the Anderson houses, but only 3.0 fragments per cubic yard in the fill of the Stanley focus houses. The presence of much greater quantities of animal bone in the earlier horizons might be interpreted as indicating a change in butchering techniques by which less bone was brought into the village in late times, or as a change in the actual importance of hunting in the total economy.

It may be significant that bison bone drops from 90.7% of the identifiable animal bone from the Monroe and Anderson foci to only 79.0% of the identifiable animal bone from the Stanley focus. As a general rule, bison hunting must have been a group activity, while the hunting of deer and small game animals was presumably an individual matter. Thus, the drop in the per cent of bison bone in late contexts may well indicate that the organized bison hunt was less common in late times. Comparative data on the bone counts and species distributions are not available for the Thomas Riggs, Meyer, and La Roche sites, so it is impossible to know whether the decrease in the amount of animal bone is a gradual one or represents an abrupt change.

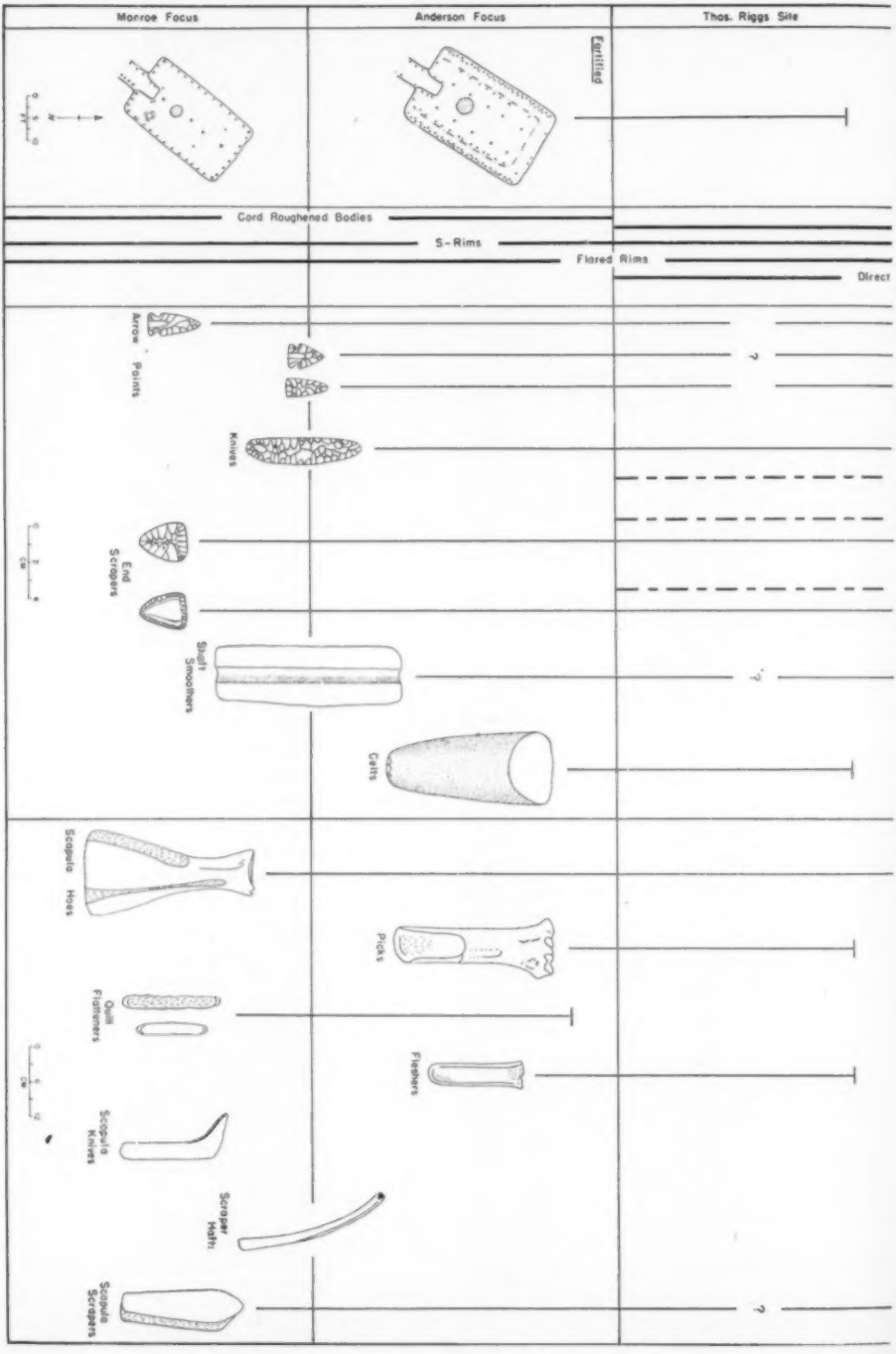
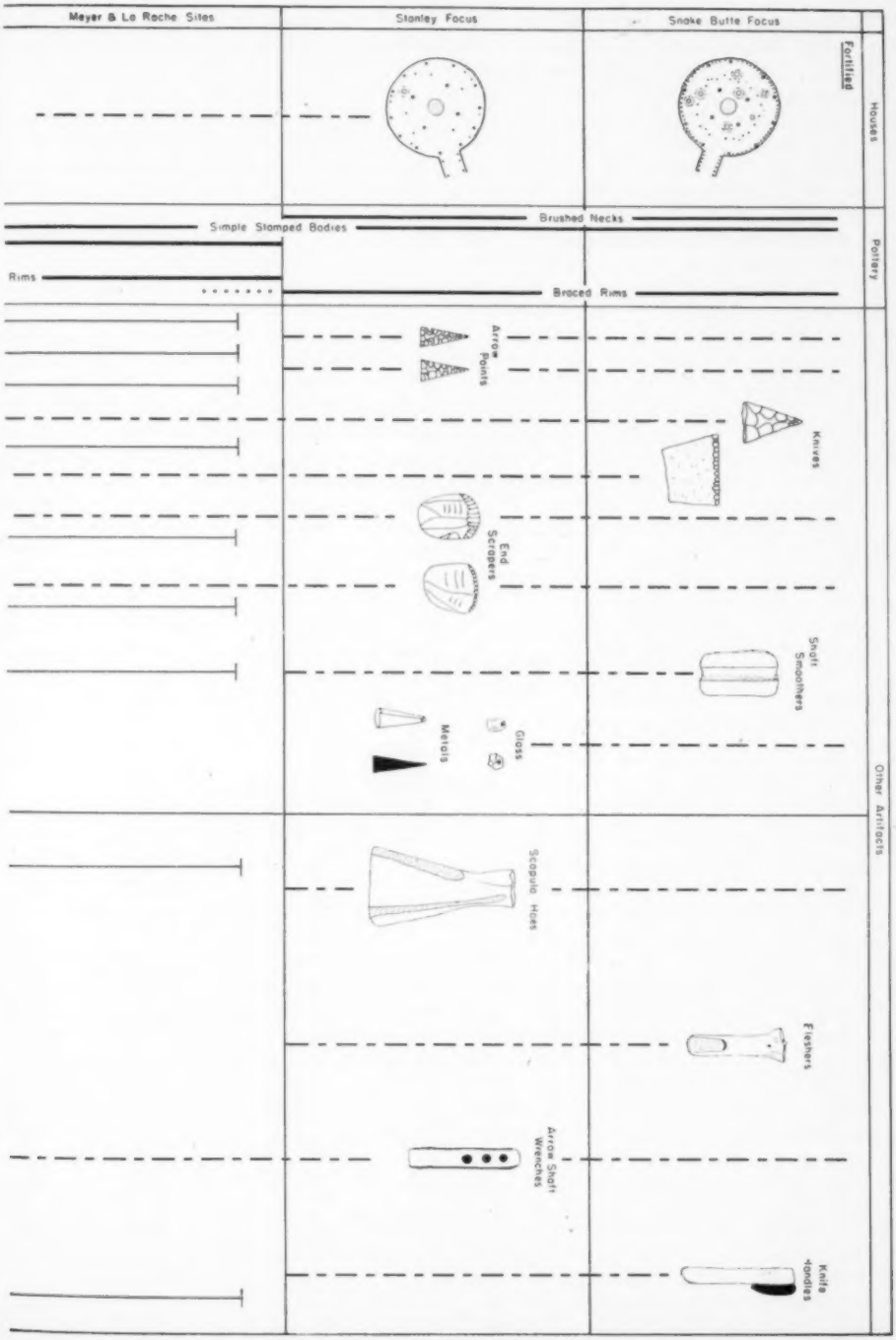


FIG. 102. Changes in the trait complex of the Fort Pierre branch.


Meyer & Le Roche Sites
Stanley Focus
Snake Butte Focus
Houses
Fortified
Pottery
Simple Stamped Bodies
Brushed Necks
Rims
Braced Rims
Other Artifacts
Arrow Points
Knives
End Scrapers
Shaft Smoothers
Gloss
Metals
Scapula Hoes
Fleshers
Arrow Shaft Wrenches
Knife Handles

To summarize, it is possible at this time to recognize six archaeological complexes in the Oahe area. The complexes have been ordered chronologically on the basis of a typological seriation derived from and based on the stratigraphic sequence of the three components at the Dodd site. There is little similarity between the earliest and the latest complexes in this sequence, but the intermediate horizons show a progressive series of changes which lead from the earliest to the latest complex.

Some of these culture changes probably represent local developments. Others appear to be due to contact with and borrowing from other groups. The simple stamped pottery, direct vessel rims, chalcedony plate knives, and percussion-flaked end scrapers which appear in the Thomas Riggs horizon very probably represent accretions from outside the area.

The change from long-rectangular to round houses between the Thomas Riggs and Meyer-La Roche horizons, together with the appearance of new pottery traits and artifact types, seems to indicate fairly extensive borrowing from some foreign source. A clue to this source is contained in Strong's brief summary of the Arzberger site (Strong, 1940, pp. 382-83). The Arzberger village, located on the east bank of the Missouri some 13 miles below the Dodd site, is characterized by round and subrectangular houses with four center posts. The village is surrounded by a log stockade and a ditch with bastions. The village itself and the associated artifact complex are quite different from anything else known in the area, and Strong points out that the assemblage is strongly reminiscent of the St. Helena focus of the Upper Republican aspect. It seems possible that the Arzberger site represents an intrusive population which was temporarily resident in the area, and which was the source of the round houses and some of the other traits which make their first appearance in the Meyer-La Roche horizon (Champe–personal communication). At the same time, it must be borne in mind that a substantial number of early traits carry over to Meyer-La Roche.

The European-American intrusion into the Plains seems to be the source of the next outside influence on the Oahe area. Contact materials make their first appearance in the Stanley focus. The increase in the amount and variety of these materials together with the appearance of the horse are good indications that this new influx of traits had a profound effect upon the succeeding Snake Butte focus. However, as in earlier instances, a substantial number of old traits were retained along with the new ones.

Probably the most significant single feature of the Oahe sequence is the absence of any sharp break in the cultural continuum. The change in house type comes at one time, changes in the pottery occur at other times, and changes in the stone and bone artifacts at still other times. At no point is a clear break with the earlier horizons demonstrated.

Because of this cultural continuity, the sequence of foci from Monroe to Snake Butte has been categorized as the *Fort Pierre Branch*. Current Plains taxonomy would call for grouping the Oahe foci into aspects. However, any attempt to set up aspects gives a false picture of the archaeological situation by implying a series of horizontal divisions. An attempt to draw an aspect line between the Anderson focus and the Thomas Riggs material would be based on changes in the pottery and some stone artifacts, but would ignore the continuity in architecture and the other artifacts. Similarly, an aspect line drawn between Thomas Riggs and the Meyer-La Roche horizon would be based on the appearance of Arzberger-like traits such as the round houses and the new artifact types, but would ignore the continuities in the pottery and the carry-over of a series of earlier tool types. Similar objections can be made to a division separating the Stanley and Snake Butte foci from the earlier horizons because of the appearance of contact material.

Some archaeologists may object to the transplanting of a southwestern term to the Plains. The term "branch" has been current in the Southwest for a number of years (Gladwin, W. & H.S., 1934). As commonly used there, it carries the implication of a cultural development through time within a specific area, a cultural development characterized by the appearance of new traits, the modification of existing traits, and the loss of old traits, but a development which is basically a cultural continuum. Since this same situation obtains in the Oahe section of the Missouri valley, and since there is no term currently in use in the Plains to connote this situation, the "branch" concept has been applied with these connotations.

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OBSERVATIONS ON THE BUTCHERING TECHNIQUE OF SOME ABORIGINAL PEOPLES: I

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DURING THE IDENTIFICATION of the osteological material from two archaeological sites (39FA23 and 39FA83) in the Angostura Reservoir basin, South Dakota, the distribution of the various elements began to assume a pattern which invited closer examination on the chance that inferences might be drawn concerning the method of preparing the carcass for food.

Although the numerical count of the elements is subject to the accidents of preservation and the size of the excavation, the distribution of the various elements from an excavation which meets the archaeological requirements is probably a reasonably accurate reflection of the parts brought into camp, since one element has as good a chance of being preserved as another.

The material from these two sites is predominantly antelope with some bison, and very little else. The antelope material was selected for this study because the entire animal could be brought to the designated spot outside the camp at which the women would do the butchering, and the elements found in the excavation represent the parts of the animal used for food.

As indicated by the osteological material these peoples exhibit a decided preference for antelope. Circumstances can safely be eliminated as a factor governing their choice because of their location on the south side of the Black Hills. Deer, bison, and small game would be equally abundant. Other cases of similar single-mindedness of diet have been called to the author's attention and, if circumstances permit, it is planned to make similar studies of their methods of cutting up the carcass. Of especial interest from this point of view is a site currently being worked by the Laboratory of Anthropology of the University of Nebraska in which the osteological material consists entirely of bison. A study of this material should furnish considerable data on the method of handling a large carcass like the bison.

* Paper read at Eighth Conference for Plains Archaeology.

The antelope material from 39FA83 was selected for this study. The greatest number of individuals represented by any element is 31. While it cannot be expected that all elements will agree perfectly with this number the accompanying table shows discrepancies which cannot be accounted for by accident of preservation. It is difficult to escape the inference that the parts either were not brought into camp, as with the thoracic vertebra, or that they were mutilated beyond recognition while cutting up the carcass, i.e., the proximal end of the humerus.

TABLE 12. FREQUENCY OF ANTELOPE BONE FRAGMENTS FROM 39FA83

	Axial	Right	Left
Skull, calvarium	12	....	....
Skull, maxilla	....	13	8
Skull, horn cores	....	4	2
Jaws	....	18	19
Vertebra, cervical, atlas	7	....	....
Vertebra, cervical, axis	10	....	....
Vertebra, cervical, other	19	....	....
Vertebra, thoracic	10	....	....
Vertebra, lumbar	17	....	....
Vertebra, sacral	1	....	....
Scapula	....	24	24
Humerus, proximal	....	3	....
Humerus, distal	....	26	30
Radius, proximal	....	28	25
Radius, distal	....	23	22
Ulna, proximal	....	23	22
Metacarpal, proximal	....	27	11
Pelvis	....	13	19
Femur, head	....	5	2
Femur, proximal	....	6	4
Femur, distal	....	6	10
Tibia, proximal	....	9	9
Tibia, distal	....	19	31
Metatarsal, proximal	....	22	15

The greatest number of skulls is less than half the total number of individuals which would indicate that the heads of all of the game were not essential to the economy and were not brought into camp. The number of jaws agrees better with the total number. It is possible that the removal of the lower jaws was the easiest way to get the tongue. The number of cervical vertebrae agree rather well with the skulls. Other than the atlas and axis

the cervicals were usually the third and fourth indicating that when the head was brought in, the neck was severed at about the midlength. The number of dorsal vertebra is less than that found in a single individual indicating that this portion of the animal was left where it was butchered. The lumbar vertebrae are nearly as numerous as the cervical and indicates that this portion was sometimes used. However, only one sacral vertebra was found in the site indicating that when the saddle was used the sacrum was usally cut off and left behind.

The fore limb could easily be removed from the thorax in its entirety, and the number of the elements indicate that it was probably brought into camp as a unit. The preparation of the limb for cooking or drying appears to have been fairly well standardized. The glenoid portion of the scapula is complete in nearly all specimens. The humerus shows the greatest discrepancy in the number of the two ends of any of the elements, with three specimens of the proximal end and thirty for the distal end. Anyone who has tried to separate the scapula and humerus with a knife knows that it is not easy, even in these days of crucible steel, and the job can be easily and effectively accomplished with a cleaver. It is clear that a stone-age cleaver would demolish the head of the humerus beyond recognition. Further cutting up of the fore limb appears to have been accomplished by smashing the radius and metacarpal near the middle as the ends are usually entire.

The removal of the hindquarters from the trunk was accomplished by breaking the ilium between the acetabulum and the sacral attachment, usually just short of the sacral attachment. There is insufficient evidence to determine whether or not the two quarters were separated before being brought into camp. The two halves of the pelvis of the immature or females would separate with cooking or later decay of the animal matter. Only in the mature males would the two halves be fused together. Only one such pelvis was found and it showed no evidence of an attempt to split it along the symphysis.

The separation of the femur from the pelvis in some cases was accomplished by cutting the head from the shaft. This was not universally true of the antelope but was for the bison. In other cases the shaft of the femur was broken just below the proximal end. The hind limb appears to have been further separated at the knee. A few blows with a stone-age cleaver would demolish beyond recognition the distal end of the femur and the proximal end of the tibia. If the knee was cut at one side or the other of the joint, one of the elements would be preserved. In all cases the distal end of the tibia is very short, indicating that the tibia was again cut just above the ankle. The metatarsal appears to have been smashed somewhere near the middle.

The distal ends of the metapodials were not included in the count because it is virtually impossible to tell the right from the left. The carpals and tarsals were not included in the count, but there was no evidence that the limb had been cut at these joints.

River Basin Surveys
Smithsonian Institution
Washington, D.C.

THE ARCHAEOLOGY OF THE SLICK ROCK VILLAGE, TULARE COUNTY, CALIFORNIA

FRANKLIN FENENGA

SLICK ROCK VILLAGE (4Tul 10) was excavated by a Smithsonian Institution River Basin Surveys field party* under the direction of the writer between June 20 and July 30, 1950. It is one of nine very similar sites which will be covered by the reservoir pool to be created by the construction of the Terminus Dam on the Kaweah River. This particular site was chosen for excavation because it showed less evidence of modification by recent cultural activity than any other of the threatened sites. Intensive excavation at a single site (rather than test excavation at several) was chosen as the preferable approach to the archaeology of the Terminus Reservoir area because we had hoped that concentrated excavation at a single site would yield an integrated account of at least one ancient community in this region. Such an account would be particularly interesting in the light of the extraordinarily full ethnographic literature on this area (Gayton, A. H., 1948 a, b; Latta, F. F., 1949).

I am not able to identify Slick Rock village with any specific historic village. A Wukchumni Yokuts hamlet named Sanukwa'o was situated directly across the stream from it and the westernmost Patwisha Mono hamlet was at Three Rivers, three miles upstream from Slick Rock. In other words, the site lies approximately on the border line between the territory of the Wukchumni and that of the Patwisha and slightly closer to known Wukchumni hamlets.

Two archaeological features offer slight preference for identifying the village as Wukchumni: Grass thatch was used as house covering at the site and by the Wukchumni, the Patwisha generally used bark. Burial in the flesh predominates over cremation at the site; the Wukchumni bury whereas the Patwisha cremate their dead. Hence the totality of the evidence favors identifying the site as the remains of a Wukchumni settlement.

Our first concern at the site was the preparation of a topographic map of the area of archaeological interest. Surface features (house pits and bedrock milling places) were carefully cleared of dead vegetation and their locations and dimensions were plotted on the topographic map. The product of this initial effort is a plat which shows the village plan for a small hamlet consisting of 13 houses and 3 separate milling places situated on a well drained knoll adjacent to the river (see Fig. 103).

For a quarter of a mile above the village the river consists of a shallow, steeply graded, riffle flowing over a cobble and gravel bed which ends at a low falls caused by the granite outcrop on which the site is located. Below the falls the river is turned sharply to the south as it flows past Slick Rock and this segment is a wide, deep eddy with a sand bottom. (Slick Rock Eddy is an important spot in Wukchumni mythology, the home of a monster who drowns swimmers [Latta, 1949, p. 10]. Contemporary residents have an analogous superstition, believing, incorrectly, that the river undercuts the rock, thereby trapping swimmers.) The river banks are lined with willows and sycamores; the surrounding hills are bare rock with open parkland with valley oak, live oak, digger pine, and manzanita the most obtrusive trees in the order named.

We began excavation at the northern edge of the site; 5660 cubic feet of soil were removed from an area 3980 square feet in extent (Johnson, F., 1951, p. 35). The soil of which the site is composed is a compact, ashy, gray-colored midden entirely different from surrounding soils which are sandy red clays. It is apparently an artificial accumulation produced largely by the decay of organic materials discarded at the site. It is deeper and more widely distributed on the northern and eastern margins of the area occupied by house pits (the extent of the midden is represented by

* The members of the field party were all then students in the Department of Anthropology at the University of California. They included: Rod Ash, Richard Bachenheimer, David A. Fredrickson, Arthur Freed, Warren Fischer, Kenneth Kennedy, and Robert Tellefsen. Dr. and Mrs. William J. Wallace of the University of California Archaeological Survey and Donald McGeein offered us welcome voluntary assistance for a portion of the work. I wish to express my indebtedness to Arthur Freed who performed a number of extra tasks including the identification of the faunal remains recovered at the site.

FIG. 103. Map of Slick Rock Village.

the heavy broken line on the site plat, Fig. 103), presumably because the prevailing winds come up the Kaweah River canyon from the southwest. The thickness of the midden varies from 0 to 52 inches, being deepest in hollows in the original rock surface. Fire cracked rocks, artifacts, and unmodified faunal remains were found inclusive in the midden, concentrated in the areas in and about the house pits. The midden lies upon a knoll of decomposing granite which was thinly covered with sand when it was first selected for a dwelling site.

House structure remains were represented chiefly by 13 shallow, saucer-shaped depressions which were visible features of the surface of the site. Both ethnographic accounts and archaeological findings indicate that these depressions are the remains of pits in which, or over which, houses were built. Twelve of the pits are approximately circular in outline and these will be described first. The thirteenth is a definite oval and seems to represent a house of a different type.

The 12 circular pits vary in diameter (measured from rim to rim) from 10.5 feet to 16 feet with a mean diameter just over 13 feet. The depths of the depressions vary from 3 inches to 9 inches and there is a positive correlation between pit depth and pit diameter. Ten of the circular houses were excavated, using a variety of techniques, but in no instance was it possible to identify a floor level. Post holes could not be recognized. This may mean that posts were not thrust into the ground or that loose midden soil will not retain the molds. Hearths are the only house feature which could be identified and these were present in 7 of the 10 excavated circular houses. They appeared as biconvex-lens shaped deposits of wood ash which vary in diameter from 20 inches to 50 inches, and in thickness from 3 inches to 8 inches. The hearths do not occupy dug pits nor is there any other evidence of special preparation of the hearth area. Three of the seven occupy the center of house pits, two lie in the south portion of house pits; one house pit has a hearth in the eastern section and one has a hearth in the northern section. The surfaces of these ash lenses occur at depths of from two to six inches below the house pit surfaces.

The thirteenth house pit is oval in outline, 15 feet wide, 20.5 feet long, and 13 inches deep. The long axis is north and south. There was a hearth in it which lay just north of the center of the pit, and which is 18 inches in diameter and 4 inches thick. It should be noted that five hearths, similar in all other particulars to those which were within the house pits, were found outside of any such pits.

Inferential evidence for the nature of the house coverings was found in the abundant occurrence of chunks of burned clay which bear impressions of grass thatch. These specimens were not found in the house pits, but were concentrated in one section of the midden deposit at the north edge of the village area, presumably being part of the debris which was cleared away from the site of a burned house. The grass impressions occur throughout some of these burned clay daubs, indicating that the clay had been thoroughly plastered into the thatch.

The ethnographic accounts of the house types of the southern Sierra Nevada foothills describe structures, the archaeological remains of which would be identical with our discoveries at Slick Rock village. The most common type has a conical framework made by setting a series of slim poles around the circumference of a circular pit. These vertical poles were held in place by four horizontal bands of willow rods, tied inside the poles at equal distances along their lengths. Each successive horizontal band has a shorter diameter than the one below it and the top band is a ring some 18 inches in diameter which forms the mouth of the smoke hole at the apex of the house. The covering material is tied to the horizontal bands and the whole is then plastered with mud obtained from the excavation of the pit. Tule is used for house covering wherever it is obtainable (mostly along the sloughs and lakes of the San Joaquin Valley floor). Grass thatch is most frequently employed in the foothills and this is the material most used by the Wukchumni. Pine bark is used in the higher mountains to the east and is the material specified for the Patwisha Mono. Illustrations of this house type have been reproduced by Latta (1949, p. 89) and Gayton (1948a, Fig. 5, *a* and *b*).

A second house type, used occasionally by the tribes of the foothills, but more common with the Valley Yokuts, probably accounts for our oval house. In this form, two crotched posts were set in the ground in an oval pit, a

ridgepole was laid across the crotches and willow poles were set up around the outline of the pit. The tips of the poles were then bent down and tied along the ridge pole, horizontal rods were tied around the inside of the circumference of the vertical poles, and a covering of tule mats or of grass thatch was tied on as in the conical houses (Gayton, 1948a, Fig. 1).

Three separate areas of exposed granite bedrock had been utilized by the women of the community as milling places where acorns and smaller seeds could be ground to flour. The spots selected are relatively horizontal surfaces of stone which are somewhat harder and more erosion resistant than similar areas which were not so used. Each of these areas consists of from 21 to 48 mortar pits varying in depth from 1 to 9 inches and in diameter from 4 to 10 inches. The shallow pits are cup shaped and the deep pits are round-pointed cones.

The first of these, feature 10, occupies a granite outcrop which separates the upper and lower terraces on which the midden is located. It consists of 25 pits distributed over an area 22 feet long and 16 feet wide. Feature 16 lies just southeast of the midden on a granite bench overlooking the river. It contains 48 pits in an area 30 feet long by 28 feet wide. This milling place would occasionally be washed by spring floods. Feature 17 is 120 feet south of the midden on the river bank. It is covered annually by high waters. There are 21 pits in an area 17 feet by 15 feet.

The pestles which almost certainly were abandoned at the mills were no longer present, presumably having been washed away, or picked up by casual visitors to the site. (In the course of reconnaissance in the southern Sierra foothills, we found many milling places, which were remote from roads and hence undisturbed, where pestles were found in somewhat greater numbers than the mortar pits at the same site.) However, we did find 14 pestles in the course of excavation in the midden. These are selected, cylindrical river cobbles, flattened on one or both ends from use in pounding, and occasionally trimmed by pecking along one edge.

Ethnographic accounts of the milling methods employed by the people of the southern Sierra foothills, including the Wukchumni, indicate pestles used in mortars in bedrock as the most frequent practice. Grinding seeds, especially acorns, was the most time consuming occupation of the women and its monotony was relieved by working in a group so that gossip could be exchanged. The concentration of 94 mortar pits in 3 small areas indicates that milling may have been a sociable labor at Slick Rock village.

Large oily seeds (acorns, pinenuts, and buckeyes) could be ground only in the shallow pits because otherwise they congeal into a pasty mass. When the pits became too deep to use for acorns they were still used for grinding various small, hard, dry seeds. Certain pits were also used for crushing mineral pigments and for pounding the clay used in pottery (Gayton, 1929, p. 245). The fullest account of the utilization of bedrock milling places is that of Gifford (1932, p. 24 and pls. 3*b*, 4, and 5). The mano and basin-shaped metate were also present at our site and these implements are described elsewhere in the text.

The remains of eight individuals were found buried in the midden. All of them were adults and four were males; the others could not be identified as to sex. Six of these were primary inhumations disposed in the following positions: 1) tightly flexed on back, head to south; 2) semiflexed on left side, head to east; 3) semiflexed on back, head to south; 4) extended on ventrum, head to north; 5) semiflexed on back, head to northeast; 6) tightly flexed on left side, head to northeast. The burials varied in depth from 21 inches to 51 inches but each of them lay on the bedrock underlying the midden. I believe that each of the burials occupied an intrusive pit, but the homogeneous nature of the deposit made it impossible to distinguish pit outlines. Rocks were more abundant in the grave-fill than in the surrounding soil and they appear to have been intentionally included. Two of the burials lay adjacent to one another (5 and 6) and may have been interred at the same time. A cobble pestle lay alongside the head of burial 5 (an adult male) but there were no other instances of possible associations of artifacts with burials.

The other two interments were secondary cremations. The burning had apparently taken place at some distance from the spot of ultimate disposal and the burned bones, together with some wood ash, had been collected and placed in shallow pits (16 and 19 inches deep) dug into the midden. Both of the cremation pits had horizontal dimensions of 48 by 30

inches. In each instance the remains were those of a single adult, the bones were blackened and broken but not burned to ash, and there were no artifacts in association.

The specific ethnographic data on Wukchumni mortuary customs (Gayton, 1948a, pp. 106-8) indicates practices nearly identical with those observed at Slick Rock village. Flexed primary inhumations in pits about three feet deep and not accompanied by grave offerings were the rule. Cremation is ascribed to the Patwisha Mono dwelling immediately to the east. The one feature of Wukchumni burial practice which could be recovered archaeologically but which is not verified by archaeological findings is the location of cemeteries on isolated hilltops situated about a mile away from the villages. We made a careful survey of all such likely localities but failed to find a cemetery, nor have local residents come upon burials accidentally in the course of agricultural and construction work. That some burials were made away from the village seems likely in view of the scarcity of human remains in our excavations.

Evidence of dietary habits consist, in part, of faunal remains found scattered, and without any special associations, throughout the midden. The total number of such remains is extremely small, indicating primary dependence on vegetal foods or, perhaps, careful disposal of garbage. The identifiable specimens include 19 shells (all of a fresh water mussel, *Margaritifera margaritifera*), 1 bird bone (red tailed hawk, *Buteo jamaicensis*), and 99 mammal bones of which there are 71 bones of the mule deer, *Odocoileus* cf. *hemionus*, 13 bones of hares and rabbits (family Leporidae), 5 bones of the bobcat (*Lynx* cf. *rufus*), 3 bones of the elk (*Cervus* cf. *nanodes*), 2 bones of the coyote (*Canis latrans*), 2 bones of the raccoon (*Procyon lotor*), 2 bones of the fox (*Vulpes* sp.?), and 1 bone of the gopher (*Citellus* sp.?).

Long bones are invariably cracked, presumably for the extraction of marrow, and 63 per cent of the bones are burned and charred. This latter feature probably reflects a method of disposal of offal rather than culinary practices. (Wukchumni hunting magic demands that dogs never be allowed to touch deer carcass remnants [Gayton, 1948a, p. 70].) The absence of fish bones is surprising in the light of the ethnographic record and the presence of fishing equipment in the site. Perhaps fish were split and fillets prepared at the stream bank and the unused remains discarded there.

Some special interest attaches to the pottery found at Slick Rock village for this area makes up one segment of the westernmost boundary of the distribution of fired clay vessels, a distribution which was carefully plotted by Gayton (1929, pp. 329-51) and which has been confirmed, except for very minor details, by more recent archaeological exploration.

I feel obliged to propose a name for this pottery type because of the archaeological prejudice, justified in most instances, against assigning the names of aboriginal political or linguistic units to archaeological types. The name which I shall use—Tulare Plain—is in concordance with current archaeological terminological practice, but it should be made clear that I regard the pottery which we found as typologically identical with the ethnographic specimens described by Gayton as Yokuts-Western Mono pottery.

Pottery sherds are the most numerous of all artifacts at the site (1104 specimens) but evidence from rim and base fragments indicates that only about 20 separate vessels are represented by the sherds. Neither the manufacture of pottery nor its use was of very great importance in the life of the community.

TULARE PLAIN

SAMPLE. Present collection of 1104 sherds and 3 restorable vessels is the basis for this description. The ethnographic collection of 19 vessels (Gayton, 1929, pp. 239-51), 2 undescribed vessels in the University of California Museum of Anthropology, a collection of over 1000 sherds and 1 restorable vessel made by the writer at Fre27 for the California Archaeological Survey, and several smaller sherd collections appear to be identical.

MANUFACTURE. Vessel walls built up by annular courses (or coiling?). Small vessels may be formed entirely by modeling. Walls thinned by paddle and anvil technique. Fired in an oxidizing atmosphere. Fire clouds absent.

PASTE. Aplastic inclusions; sparse micaceous sand (probably decomposed granite and probably present in clay source). Texture: fine, compact. Fracture: commonly occurs along coil unions. There is no tendency toward surface spalling, scaling or erosion. The ware is not crumbly.

Hardness. Range from 3.0 to 4.0, majority of sherds 3.5.

Color. Very variable (even on a single vessel), dark browns and reddish browns predominate.

Thickness. Vessel walls vary in thickness from 3.0 mm. to 7.0 mm. with a mean thickness of 5.0–6.0 mm. There is a perceptible decrease in thickness of the vessel wall from base to rim. Basal sections are heavy, and as thick as 12.0 mm.

FORM. Restorable vessels are of two forms: flat bottomed, vertical walled bowls of approximately one pint capacity; and flat bottomed "flower pot" shaped vessels, with walls which slope outward, of about one gallon capacity. The outline of all vessels is simple, there is no area which can be regarded as a shoulder or a neck. There is no special treatment of the rim or of the lip areas. Three fragments appear to represent lug handles which were attached at a point somewhat below the rim.

TREATMENT OF THE EXTERIOR. Surfaces are smoothed but not polished. There is no decoration in any form except for two cone-shaped fragments, which may be lug handles, both of which bear rows of fingernail punctations.

There are 15 sherds and 2 complete vessels made of steatite. The two complete specimens are *comals* or scoop-shaped frying pans each of which is perhaps made from a sherd of a larger vessel. One is triangular in shape, 105 mm. long, 85 mm. wide, 11 mm. thick, and is provided with a large perforation at the narrow end to permit drawing it from the fire. The second is oval in outline, 210 mm. long, 140 mm. wide, 14 mm. thick, and is constricted at one end to form a handle. This specimen, as do several of the sherds, bears a heavy carbon stain indicating its use in cooking. The *comal* is an important artifact type along the Santa Barbara Channel and specimens have been found in the southern portion of the San Joaquin Valley, but these pieces are the northeasternmost specimens thus far reported.

The steatite sherds vary in thickness from 4 mm. to 19 mm. The common vessel form seems to have been a shallow, round bottomed bowl. Five of the sherds are rim sherds and two of these have been decorated by closely spaced, incised lines which cross the rim at right angles to it. One sherd has a perforation close to one edge, presumably made in order to permit the repair of the vessel by crack-sewing.

Three sherds have one or more edges ground to a straight square form. These specimens probably served as smoothing and scraping tools in the manufacture of pottery.

One of the sherds, and both of the *comals*, bear long, straight, awl sharpening grooves which cross their convex surfaces in an irregular grid pattern. The larger *comal* also has a small gouged pit in the center of its convex surface. During the excavation of Fre27, a Wobonuch Mono informant identified similar gouged pits on steatite sherds as being used to steady acorns while they were being cracked in the hulling process.

Chipped stone points are relatively rare at Slick Rock village. This may reflect a non-importance of hunting in the subsistence pattern (and a similar non-importance of warfare as a political mechanism) or it may mean that most of the projectiles were tipped with simple hardwood points.

The points which do occur belong to two very different classes: There are four small arrowpoints of obsidian which are triangular in outline. One has a deeply concave base and lateral notches, the other three have slightly concave bases and lack notches. These specimens range in length from 20 mm. to 34 mm., in width from 9 mm. to 14 mm., and in weight from 0.5 gr. to 2.3 gr. The second class of chipped stone points is represented only by very fragmentary examples, also made of obsidian. There are five pieces of what seem to have been large, parallel sided, concave base points. Reconstruction of these specimens indicates typical lengths of approximately 100 mm., widths of 25 mm., and weights approximating 25 grams.

Three large flakes of obsidian have been carefully retouched by pressure flaking along their longer edges. These specimens have an average length of 50 mm., a breadth of 30 mm., and average about 7 mm. in thickness. They would serve adequately as small knives for generalized purposes.

Awls made from split deer metapodial bones were relatively abundant, 30 fragments occurring in our excavations. There are three complete specimens, two of which employ the proximal end of the bone and one of which uses the distal end of the bone as a handle (these are respectively Gifford's types AlbII and AlbI [Gifford, 1940]). The specimens range in length from 148 mm. to 170 mm. and all of them have extremely sharp, long points which are circular in cross section. There is

one unfinished piece in the collection. The steatite awl sharpeners are described elsewhere in this text.

All of the fragments, except for one piece, and one of the complete specimens are thoroughly burned. It does not seem possible to account for this high incidence of charring except as an intentional act on the part of the users, perhaps connected with the similar condition noted for unmodified animal bones.

Bone awls, like those found at Slick Rock village, are the invariable concomitant of coiled basketry in central California ethnographic reports, and specimens are known for the various Yokuts and Mono bands. They are the necessary tool for the manufacture of "sewn" baskets and their importance at our site is inferential evidence for the importance of coiled basketry.

The question of whether or not we can infer the presence or absence of coiled basketry from the presence or absence of bone awls is one of general interest. While bone awls have an extremely wide distribution in North American archaeology, they are definitely absent from some specific complexes (e.g., the Early Horizon of the Sacramento-San Joaquin delta and the Middle Horizon of the central California coast). Conversely, a cursory survey of the literature indicates that they occur in abundance in all complexes in which preservation makes the positive identification of coiled basketry possible.

Six flat, disc-shaped beads of steatite were found. These pieces range in diameter from 7 mm. to 10 mm. and in thickness from 2 mm. to 4 mm. Each of them has a central conical perforation which tapers from about 2 mm. to 1 mm. in diameter. Identical specimens have a wide areal distribution in California but everywhere appear to be confined to chronologically late archaeological deposits.

Steatite was also employed in the manufacture of labrets and pendants. A single labret was found on the floor of one of the houses (feature 14). It has the form of a flat spool, one disc of which is larger than the other. This particular specimen has discs which are 45 mm. and 38 mm. in diameter separated by a groove which is 30 mm. in diameter. It is 14 mm. thick. The larger disc has been coated with asphaltum which has resulted in a glossy, black surface. An almost identical specimen is illustrated in Wedel (1941, pl. 31, fig. *p*).

Five steatite pendants, of a variety of simple shapes, were found. One specimen is circular in outline, 37 mm. in diameter, 9 mm. thick, and has a central perforation which is 7 mm. in diameter. It is slightly concavo-convex in cross section and was probably made from a steatite vessel sherd. One piece is rectangular with rounded corners. It is 30 mm. long, 27 mm. wide, 5 mm. thick and has a central perforation which is 4 mm. in diameter. A third piece is an isosceles triangle, 43 mm. long, 16 mm. wide, 4.5 mm. thick and has a perforation near its broad end. One specimen is too fragmentary to permit a definition of its shape. The final steatite piece is a ring, 14 mm. in diameter, 4 mm. thick and has a perforation 8 mm. in diameter. Very similar specimens are illustrated from Buena Vista site 1 (Wedel, 1941, pl. 31, figs. *j* and *k*).

One other stone specimen is probably of ornamental function. It is a thick ring made from a soft (between gypsum and calcite), extremely light weight siltstone of buff color. It is 34 mm. in diameter, 22 mm. thick, and has a large, biconical perforation. This piece has been painted with a red mineral pigment.

Shell beads of two forms were found. There are ten specimens which are discs cut from the wall portion of *Olivella* shells (Gifford's type X3bI [Gifford, 1947]). These specimens vary from 4 mm. to 8 mm. in diameter. A single whole specimen of *Olivella biplicata* was found, which may mean that the raw material was imported and that the beads were made at the site. The other shell bead form is represented by a single specimen. It is a tubular bead, 25 mm. in length and 5 mm. in diameter, made from the hinge portion of an unidentified clamshell.

Three glass beads found at the site are described in the section on artifacts of commercial origin.

There are eight small fragments of ocherous earths, three of which are yellow in color and the rest red. Two of the specimens exhibit grinding facets. Minute flecks, too small to be collected, were present throughout the deposit. Only a single painted object was found at our site, a stone ring, described elsewhere in the text, but painted petroglyphs are an important feature of the local archaeology and paintings in red, white, and black occur at four sites within five miles of Slick Rock village (4Tul 2, 4Tul 51, 4Tul 55, and 4Tul 56). Gayton

(1948a, p. 68) has described the sources of Wukchumni mineral pigments, and their utilization for personal ceremonial ornament.

Although the pestle and the bedrock milling place were the most important evidences of milling activity at Slick Rock village, the mealing slab was also used. The single specimen found is a fragment, made of granite and has a shallow, oval, basin-shaped depression. There are two manos, one of which is an oval granite stream pebble exhibiting slight grinding on both faces and slight pounding on the ends. The second specimen is shaped like a short barrel and the surfaces which show wear are the ends. I do not know of any analogous specimens but this certainly seems to have been used as a mano.

Heavy tools with a blade on one or more edges, produced by percussion flaking, were abundant. They are all made from fist-sized, stream pebbles of a dense, blue-black, metamorphic rock. They are so crude in workmanship, and so generalized in form, that only the broadest typological differentiation can be recognized.

Scraper planes constitute the most numerous form, 53 occurring in our excavations. In general, these specimens resemble a flattish cone-shaped core, the base of which is the stream polished surface of the original pebble, the blade is all or most of the circumference of the specimen, sharpened by having had chips knocked away from it.

The second form is the chopper, 42 of which were found. These have been made from flattish, oval or rectangular pebbles by knocking large chips from both sides of one end of the specimen. The final form resembles the polished stone celt in outline. The blades of these specimens are often dulled by excessive battering.

The only function which I might suggest for these percussion flaked implements is as wood working tools, specifically as a hand held adze or plane and as a hand held ax. House construction, at least, would have required some such implements and there are no other pieces in the collection which might have so functioned.

There are six fist-sized, stream pebbles which exhibit the marks of heavy battering on one or both ends. Two of these are of quartzite, the rest of granite. They may have been used in the manufacture of the percussion flaked implements.

There are five specimens identifiable as tubular pipes made of pottery. Four of these are sufficiently complete to permit description. All of them are made of a paste which appears to be identical to that used in the manufacture of pottery. Three have the form of elongated cones, modeled around a straw which was burned or pulled out to form the stem perforation. The bowls are thimble-sized depressions made in the large end of the cone, apparently with the finger tip. The single complete specimen of this form is 104 mm. in length, 26 mm. in diameter at the bowl end, and 11 mm. in diameter at the stem end. The bowls of these three specimens contain a charcoal "cake." The fourth piece is complete and might be described as trumpet shaped. It has a cylindrical stem which is 44 mm. in length and 9 mm. in diameter. The bowl flares abruptly to a diameter of 16 mm. The total length of the specimen is 54 mm. Clay pipes, similar to those found at the Slick Rock village, were made by the Wobonuch Mono of the ethnographic period (Gayton, 1929, p. 246), and, by inference, also by other Western Mono and Foothill Yokuts groups.

Artifacts derived from industrial cultures were rare at Slick Rock village, but the presence of such pieces is important in that it permits us to arrive at an approximate date for the occupation of the site. The site was abandoned before such contact introduced any important changes in the native material culture and the social significance of such contact was probably similar to that represented by aboriginal trade for such non-local materials as olivella shell beads and obsidian projectile points.

Three glass beads were found. Two of these are short hexagonal tubes with irregular ends. They are transluscent, and are bright blue in color. They belong to Meighan's type 156.[1] Their known distribution includes the following sites: Sha20, Hum169, Fre27, SJo26. None of these sites came directly under Spanish-

[1] The type collection to which this refers is in the University of California Museum of Anthropology. I am indebted to Clement W. Meighan of the University of California Archaeological Survey, who organized the type collection, for these comments on the distribution and dating of our specimens.

Mexican influence and this bead type is probably to be attributed to American or possibly to Hudson's Bay Company origin at a point in time post-dating 1830. The third glass bead is a unique specimen, not represented in Meighan's typology. It is deep green in color, oblate spheroid in form, 19 mm. in diameter, 17 mm. long, and has a perforation which is 3 mm. in diameter. Meighan suggests that beads of similar size and shape are late (post 1840) in California.

Two slender (4 mm. in diameter), cylindrical, iron rods were found together on the floor of feature 14. They approximate identity in form but there is a slight difference in their lengths (220 and 226 mm.). The specimens taper to a long conical point at one end and are square at the other. Both of them are beveled off from one face at the squared end. I have seen Wobonuch Mono spearing suckers in the Kings River using identical points (in that instance made from two tines of a pitch fork) mounted on a long shaft in such fashion that they diverged toward the tip. The fish were impaled by the points and held secure by the wedging effect of the divergence of the tips. The beveled bases of our specimens would facilitate similar mounting and their paired occurrence is consistent with the fish-spear interpretation. No specific date can be suggested for these pieces, but they more closely resemble the items which Indians secured by trade with the Americans than those which they secured from the Spaniards. This, in turn, would imply a mid-nineteenth century dating.

There is one fragment of a glazed stoneware vessel. The glaze is orange in color, the paste gray. The small fragment does not permit fuller description and the piece is not datable.

Slick Rock village was a small community of not more than 13 households occupied in part during the first half of the nineteenth century. The spoken language was probably the Wukchumni dialect of Yokuts but individuals who spoke Mono may have been included in the group. Subsistence was gained by the collecting of wild vegetal products, especially acorns. Hunting and fishing were of secondary importance and deer outnumbered the other products of the chase. Trade, perhaps indirect, was maintained with representatives of commercial cultures but the effect had not yet made any important changes in the local economy.

The material culture inventory is a short one and the material side of life would have to be described as extremely simple. Even so, within this simple framework, a number of alternative types of behavior were possible: cooking could be done either in pottery or in steatite vessels, perhaps also in baskets; seeds could be pounded or ground to flour; houses could be circular or oval in outline; beads of any of several types could be worn.

Evidence for the social and ceremonial aspects of life is very meager. The small size of the community might imply that the ideological structure was very simple. The single aspect of such structure which is most frequently recovered by archaeologists is that relating to mortuary customs. As represented by our excavations, disposal of the dead was variable, but was always simple and practical. Elaborate preparation of the grave and funeral furniture are lacking. Evidences of warfare are lacking—but then so are evidences for shamanism. Perhaps even complete excavation of a village site will never give us a full picture of an ancient community.

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THE 1950 EXCAVATIONS AT SITE 45BN6 McNARY RESERVOIR, WASHINGTON

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THE RIVER Basin Surveys' program, particularly in the Columbia River Basin, has had a peculiar role in American archaeology. Generally speaking, archaeological research programs should be oriented toward a specific problem such as the study of a certain culture sequence or an inquiry into a particular time horizon. In contrast River Basin Surveys' problem has been to examine in detail almost every phase of every culture that is represented over a vast area. True, the field of research has been limited to those portions of river basins that are scheduled to be inundated upon the completion of a number of dams, but because of the aridity of the Columbia Basin a vast majority of the aboriginal population was concentrated along the major streams. Thus the reservoirs planned for those streams will flood a large portion of the cultural material existing in the region.

The procedure for closing with a problem as general as that described above has been to attempt to salvage all that is possible of the cultural remains of each site up to the point where duplication becomes evident. One watches, on the one hand, the amount of work that remains to be accomplished while upon the other one views, often with alarm, the scheduled completion date of the dam with its accompanying flooding. To make haste slowly has been the real problem.

The summer months of 1950 were the most active of any since the River Basin program was started in the Columbia Basin. Four parties of from 8 to 12 men each were excavating in archaeological sites within the region; in McNary, Chief Joseph, Equalizing, and O'Sullivan Reservoirs. It is with the McNary Reservoir and a single site, 45BN6, that this report is concerned. Douglas Osborne, of the faculty of the University of Washington, was in charge of the field work, while the writer as Acting Field Director, was in charge of the River Basin Surveys office in Eugene, Oregon.

Almost all of the work at site 45BN6 was concerned with excavating the remains of the shallow semi-subterranean houses that once had formed a small village. Located some 9 miles east and upstream from the site of the McNary Dam, the village consisted of 60 house pits situated on a long flat terrace above the Columbia River. The terrace itself is composed of recently deposited sands and gravels with a topsoil of loess. A thick deposit of volcanic ash is prominent where the river bank has been eroded. At sites 35UM3, 35UM7, and 35UM8 cultural materials were in close contact with volcanic ash (Osborne and Shiner, 1950), and were probably of nearly the same age, but at 45BN6 the cultural materials were well above it.

There was no indication there had been any settlement plan at the site other than that of stringing the houses along the terrace parallel to the river. A sharp division of the village into parts was noticed at sites 35UM7 and 35UM17, both of which were located almost directly across the river but no such division occurred at 45BN6. There existed a difference in the sizes of houses but there seemed to be a random placement of the different sizes.

The two small house remains which we called house pits 5 and 6 were tangent, giving the appearance of having been occupied simultaneously (Fig. 104). Further evidence for such a conclusion was found, not only in the close similarity of their artifacts but in the fact that in neither pit was there back dirt from the other. Had one of the houses been constructed after the other had been abandoned, the dirt from the excavation would certainly have been deposited in the abandoned pit. If both houses had indeed been occupied at the same time, they would have been very close together if not actually joined. The long narrow house, known as the mat-house, was in popular usage during the historical period in the area, while the circular type, known as the earth lodge, seems to have been abandoned soon after the beginning of the nineteenth century.

House pits 5 and 6 were nearly circular, each being about 13 feet in diameter. The subterranean portions were 2.5 feet deep and were shaped like shallow saucers. Both houses had been occupied several times as shown by succeeding dark streaks that marked the floors. Each streak, composed of charcoal and ashes from the fireplace at the center of the house,

became indistinct as it neared the outside edge of the pit. So far we have been unable to determine the length of each phase of occupation. Each floor level may have represented a single season or several seasons, but the artifact content of each house was much too limited for any conclusions of that nature.

No evidence could be found of a superstructure either in the form of post holes or of the house frame itself. This was true of all of the houses that were excavated at the site.

House pit 7 was slightly larger than the first two and more oval in shape. It was 17 feet long, 15 feet wide, and between 2 and 2½ feet deep. Excavation of the house revealed that there had been three separate floors that represented different periods of occupation. Each floor level almost exactly paralleled the one that preceded it although the most recent one was slightly more shallow in shape than the first or second floors. The same remarks that were made on the floor levels of house pits 5 and 6 apply also to house pit 7.

House pit 59 (Fig. 105, *b*) was considerably different from the other dwellings at the site. It is the only example of a long mat-house so far excavated. The structure, which would have been approximately 65 feet long, 16 feet wide, and excavated to a depth of only one foot, would fit exactly the descriptions of houses given by the Umatilla Indians in Ray (1942, p. 174). In further contrast to the other houses that were excavated at the site, only one occupation level was found in house pit 59. While only one fireplace was discovered others must have existed, for the mat-house is described as being a multi-family dwelling and would have been much too large for a single family. A small rock oven found in the west end of the house proved to be unassociated with the occupation of the house. Apparently it had been used at some time after the house had been abandoned.

Several test pits were excavated in the steep bank at the river's edge in hope of finding an over-the-bank dump. When little or no midden material could be found we concluded that either the refuse had been carefully thrown into the water or else flood waters had washed it away. In one of the test pits, however, a complete burial was encountered. The remains were of a male somewhat over 50 years of age. All metrical measurements and morphological observations fell within the expected ranges and no anomalies or pathological conditions could be seen. The teeth were in extremely poor condition, which would be expected for an individual of that age.

A rather small collection of artifacts was obtained at 45BN6. This came as no surprise, for the houses in the McNary Reservoir area have invariably yielded little in the way of material culture. It has been unfortunate for the archaeologist that the Indians in that area were such neat and careful housekeepers.

In house pits 5 and 6 there were quite a number of articles that had been obtained from the whites. They included fragments of tin cans or cups, a large calibre rifle or pistol ball, and a fragment of what may have been a square nail. These articles, which were associated with several small pieces of leather, a basalt cobble chopper (Fig. 105, *a*, *25*), and a cobble hammer (Fig. 105,*a*, *10*), were all found on or above the most recent floors. The leather may or may not have been aboriginal; it was too fragmentary for identification. Below the top floors of the two houses we found two elk-rib fleshing tools and a small number of cobble hammers, choppers, and spall flakes. Most of the choppers and hammers were of basalt while the spall flakes were of quartzite, all crude generalized tools. While no trade goods appeared, the bone fleshers appeared to have been cut with a steel knife. A few fragments of leather and a wooden awl were also found at that level.

In house pit 7 much the same assemblage of artifacts was found. In addition to several fragments of tin cans or cups, we found a quartzite chopper, the tip of a projectile point, and a bone awl. A machine-made mother-of-pearl button (Fig. 105, *a*, *15*) and a horseshoe were also found above the most recent floor level. Since the horseshoe was found only a short distance below the surface, it may not have been associated with the occupation of the house but may have been deposited in the house depression at a later date.

The artifacts from below the latest floor of house pit 7 included three cobble hammers, two spall flakes (one shown in Fig. 105, *a*, *19*), a cobble chopper (*20*), and a notched net sinker. The only article of trade was a piece of canvas that has yet to be completely studied.

The artifacts from house pit 59 were all presumed to be associated in time since there was only one floor or occupation level found.

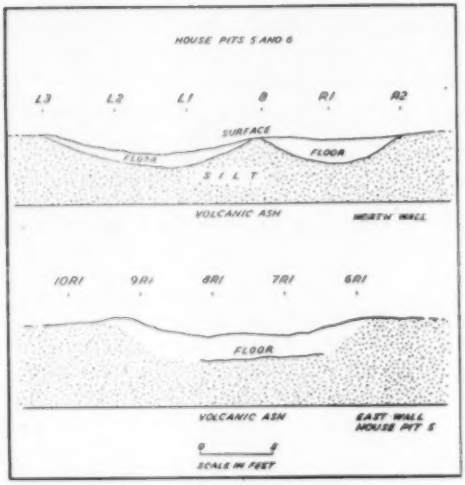

FIG. 104. Sections through house pits 5 and 6 at 45BN6.

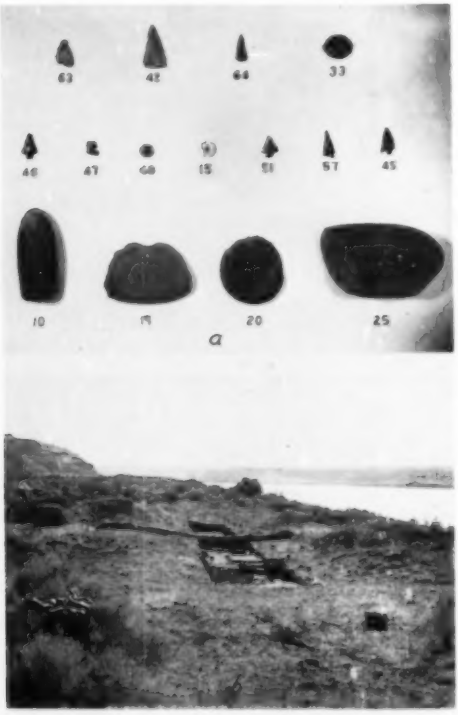

FIG. 105. *a*, artifacts from 45BN6; *b*, Excavating in house pit 59.

The trade goods included 2 small fragments of "window" glass, 3 tiny glass trade beads, and a small brass stud (Fig. 105, *a*, 68) of the type commonly used with leather. The arrow points, of which there were 12, were either triangular and unnotched (63 and 42), notched on the side (47 and 57), or notched from the corner (45, 46, and 51). All of the points were small and the materials included obsidian, jasper, chert, and petrified wood. Other artifacts from the house pit consisted of a few small crude scrapers (Fig. 105, *a*, 33, 64) made from the same materials as were the arrowpoints, a hammerstone, and a grooved basalt pebble that may have been used for polishing arrowshafts.

No artifacts were found in association with the burial nor were any found in other test pits at the site. There were, however, a number of finds on the surface of the site, the best of which was a stone bowl 5½ inches in diameter. A large number of choppers, hammerstones, spall flakes, and notched net sinkers were also found on the surface.

Several piles of medium to large sized rocks were noticed along the terrace a short distance from the house pits. They were too far from any talus slope to have been natural formations and seemingly could only have been of human origin. Several were partially excavated with no cultural materials being found beneath them. The only conclusion reached was that they might be the result of spirit quest training as described by Spier and Sapir (1930) for the Wishram who lived approximately 100 miles downstream. According to the informants, children were given a period of vigorous training before being sent on the quest of a familiar spirit. One of the tasks to be performed was the piling up of rocks that were as large as the strength of the child would permit. No other explanation would seem to fit the situation.

The village at 45BN6 apparently was occupied from some time late in the 1700's to approximately the middle of the nineteenth century. This estimate is based on the scarcity of trade goods in the early phases of the occupation and the quite modern appearance of the trade goods that were found in association with the latest occupation levels. Only one historical reference to the village has been found to date. In 1812, Robert Stuart stopped at a village which Rollins (1935, p 61) identi-

fied as being located at approximately the present site of Mottinger, Washington. Site 45BN 6 is situated on the same terrace as Mottinger Station and lies only a few hundred feet east of it. Stuart's Indian village was apparently the same. The only other villages within miles on either side of the river were found to be either of earlier occupation period or small and inconsequential. If this assumption is true, it indicates that the circular earth lodges were in use at that time, later than most anthropologists would have believed.

The houses at 45BN6 were very similar to all others excavated in the McNary Reservoir area. The chief difference lay in size, the average maximum diameter being somewhat smaller than those at 45BN53, 35UM17, and 35UM7. There was little information gained on the method and procedure of house building, only further proof that the subterranean or dugout portion of each house was merely a shallow depression without a well defined entrance way. Since no evidence of superstructure could be detected we can probably abandon hope of finding such evidence elsewhere. If it could exist anywhere, it should have been found at 45BN6, the most recent of any village site so far excavated in the Reservoir. The mat-lodge which apparently was occupied contemporaneously with the earth-lodges was something new as far as our excavations were concerned although it has been accurately described in ethnographic reports (Ray, 1939). Unfortunately, however, even less information was obtained on its construction than on the earth-lodges for it was built almost entirely above the ground. At the deepest point, the subterranean portion did not exceed one foot in depth. Since the horizontal dimensions agreed so completely with those given by Indian informants there can be small doubt but what their descriptions of the superstructures are full and accurate. The remaining problem is that of determining the origin and history of the mat-lodge.

From the few artifacts recovered at the site a number of observations can be made. Hunting played a much larger role in the economy than most anthropologists or historians presumed. Osborne (1949), however, had clearly demonstrated this fact for sites 45BN3 and 45BN53. No doubt fishing was the primary occupation in the area but the large number of projectile points, scrapers, fleshers, as well as animal bones, cannot be ignored.

No new artifacts or artifact complexes appeared at 45BN6. The projectile points and other stone tools were very similar to those found at other McNary sites excepting 35UM7, an early site. Generalized stone tools such as hammerstones and choppers have gone unchanged in size, shape, or relative numbers.

If we are correct in our assumption that the rock piles on the site represented the results of the "Spirit Quest" training, it is the first observation of the trait in the McNary area. The concept of the guardian spirit is widespread in the Pacific Northwest, particularly in the Plateau, but rarely have evidences of it appeared in archaeology.

When studies have been completed on the animal bones, the soil samples, and the trade goods, a much clearer picture of the village will be available. The time perspective will be brought into clearer focus, food preferences and problems will be discovered, and perhaps the relationship of the site to others in the area will be clarified.

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MATERIAL CULTURE OF AN UPPER COULEE ROCKSHELTER

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THOUGH THE NUMBER of recovered cultural remains are few, the authors believe that the brief description and analysis of these artifacts are important, as site 45GR2 is the first dry shelter to be excavated in the Columbia Plateau. *

The area itself falls into the Upper Sonoran life zone. The plateau above the coulee is generally treeless and is more or less well covered with bunch grass. Lupines and sunflowers are important parts of the flora. In the coulee, ground water is more available, and better stands and more species of grasses are present. Successful wheat farms and a few orchards indicate that the area must, at least during certain seasons, have had an extensive floral cover. Aspen, willow, alder, and cottonwoods are found near the springs. The draws support heavy stands of brushy growth, with sage being outstanding. Juniper (cedar) trees are found both on the plateau and in the coulee. The bottom of the coulee, at least during and after the spring and early summer rains, is swampy, and standing water was probably present in earliest times in some places throughout most of the year. Rodents, small carnivore, and bird populations are large. The mule deer was no doubt the largest game animal of importance.

The rockshelter is located in the northwest wall of the Upper Coulee (Upper Grand Coulee) of the Columbia Plateau in north central Washington, some six miles southwest of the town of Grand Coulee, in an area occupied historically by Nespelem and Sanpoil bands (Ray, 1932, p. 12). The coulee, situated about 500 feet above sea level, is contained by vertical basalt walls rising 700-900 feet above the coulee floor, which is composed of outcrops of granite, basalt, and of silt deposits. The axis of the shelter face runs northwest, i.e., parallel to the coulee wall, and the overhang juts out 40 to 50 feet over the site, the roof rising at its highest point at least 100 feet above the floor. A fine small spring (10 gallons per minute) flows onto the coulee floor from the wall immediately below the shelter.

The surface of the shelter is covered by angular basalt blocks that had fallen from the roof. On the back wall are eleven pictographs and the sooty evidence of fires. Only one small pit evidenced earlier digging at the site when the excavators arrived at the site in July, 1950. Collectors were perhaps discouraged by the difficulties of burrowing in basalt fill.

Excavations were carried to 84 inches, but the original floor was not reached. The workers were handicapped by encountering basalt boulders in a constant mass from the surface level to the base of operations. Fragments of grass lenses were observed in the rock fall, and human culture remains were found scattered around and under the basalt blocks for the entire depth. In 1947 the survey party recovered from the surface a string snare, a piece of bark tied in a square knot, and a broken arrow shaft (Drucker, 1948). The material described below was recovered during the 1950 excavation.

The following botanical specimens were found. Some of the plant remains were no doubt wind-blown local growth or animal carried. The most significant plant remains are, of course, those used in the perishable artifacts discussed below. *Pinus ponderosa* (western yellow pine), *Artemisia* (sage), *Apocynum* (Indian hemp, spreading dogbane), *Lupinus* (lupine), legume seeds, *Fistuca idahoensis* or *Agropyron spicatum* (grass-wheatgrass), *Typha* (cattail), *Eriogonum* (sulphur flower), *Elymus condensatus* (ryegrass), *Philadelphus* (mock orange), *Rhus radicans* (sumac), *Acer circinatum* (vine maple), *Leptodactylon pungens* (gilia), cherry pits, apricot pit (found 2.5 feet below surface, an indication of the impossibility of assigning proper depth to any of the finds), *Juniperus* (cedar, juniper), *Scirpus* (tule, bulrush), *Lithospermum* (gromwell), *Prunus demissa* (choke-cherry), *Astragalus lentiginosus* (milk vetch), *Phragmites communis* (reedgrass), *Salix* (willow), *Balsamorhiza* (balsamroot), *Stipa columbiana* (needlegrass), *Oryzopsis hymenoides* (ricegrass), *Sambucus* (elderberry), *Brassica* (wild mustard), *Alnus* (alder), and *Sugi gigantica* (western red cedar) were

* Excavation was undertaken by a Smithsonian Institution–River Basin Surveys crew, supervised by Sam Tobin, under the field direction of Douglas Osborne, in the summer of 1950. Catalog numbers give the site followed by a sequence number: e.g. 45GR2/10. See Figure 108 for site location.

present. Floral remains were identified by C. Leo Hitchcock and H. Weston Blaser, of the University of Washington Department of Botany, and by Arthur J. Cronquist, of the State College of Washington, Pullman, Washington.

Table 15, in the succeeding paper, gives the faunal remains for 45GR2. This cave site had the greatest number of genera of any of the sites excavated in the 1950 season. Most of the smaller mammals, rodents, and the bats were no doubt fortuitous. The muskrat and otter reflect the presence of standing or flowing water nearby on the floor of the coulee. Both were, no doubt, hunted, and the muskrat appears to have been important locally, probably for both food and fur. Bison bones included two horns; this animal forms a not unimportant quantitative aspect of the assemblage.

A number of stone artifacts were recovered. Thirty-four identifiable points were taken from the shelter. These artifacts, together with scrapers and retouched flakes, are the largest category. Table 13 gives the preferred materials.

TABLE 13. ARTIFACTS AND MATERIALS

	Projectile Points	Scrapers, Chipped Flakes
Chalcedony, agates, carnelian	11	22
Jaspers	6	17
Opal	6	----
Basalt	4	----
Obsidian	4	----
Micaceous quartzite	3	----
Petrified wood	----	3
Opalite	----	1
Flint	----	1
Cryptocrystalline quartz	----	1
	34	45

Typical points are illustrated in Figure 107, *m-bb*. Classification of point types was made on basic outline and directional cut of the notch. Subtypes were determined by the positional appearance of the bilateral notching and the angular degree of the notches to the long axis of the projectile point. Table 14 gives data on the points and a description of the types. For purposes of reference in the succeeding discussion the point types will be their individual signifying letter in Figure 107. Thus, type *t* is a small triangular point with median or high side-notches and a flat base.

The loose mass of rock fall that was present from surface to excavated base made temporal differences in artifacts insignificant. The weight and movement of falling rock must have caused a constant shift of material. In spite of the care exercised during excavation, there was some downward sifting. Therefore, for comparative purposes, an arbitrary median

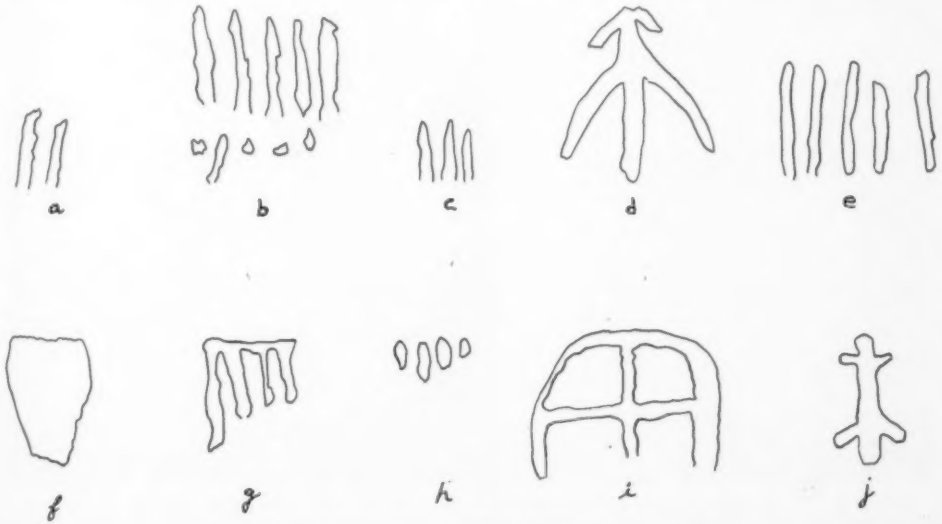

FIG. 106. Pictographs on rear wall of shelter, 1/7th actual size.

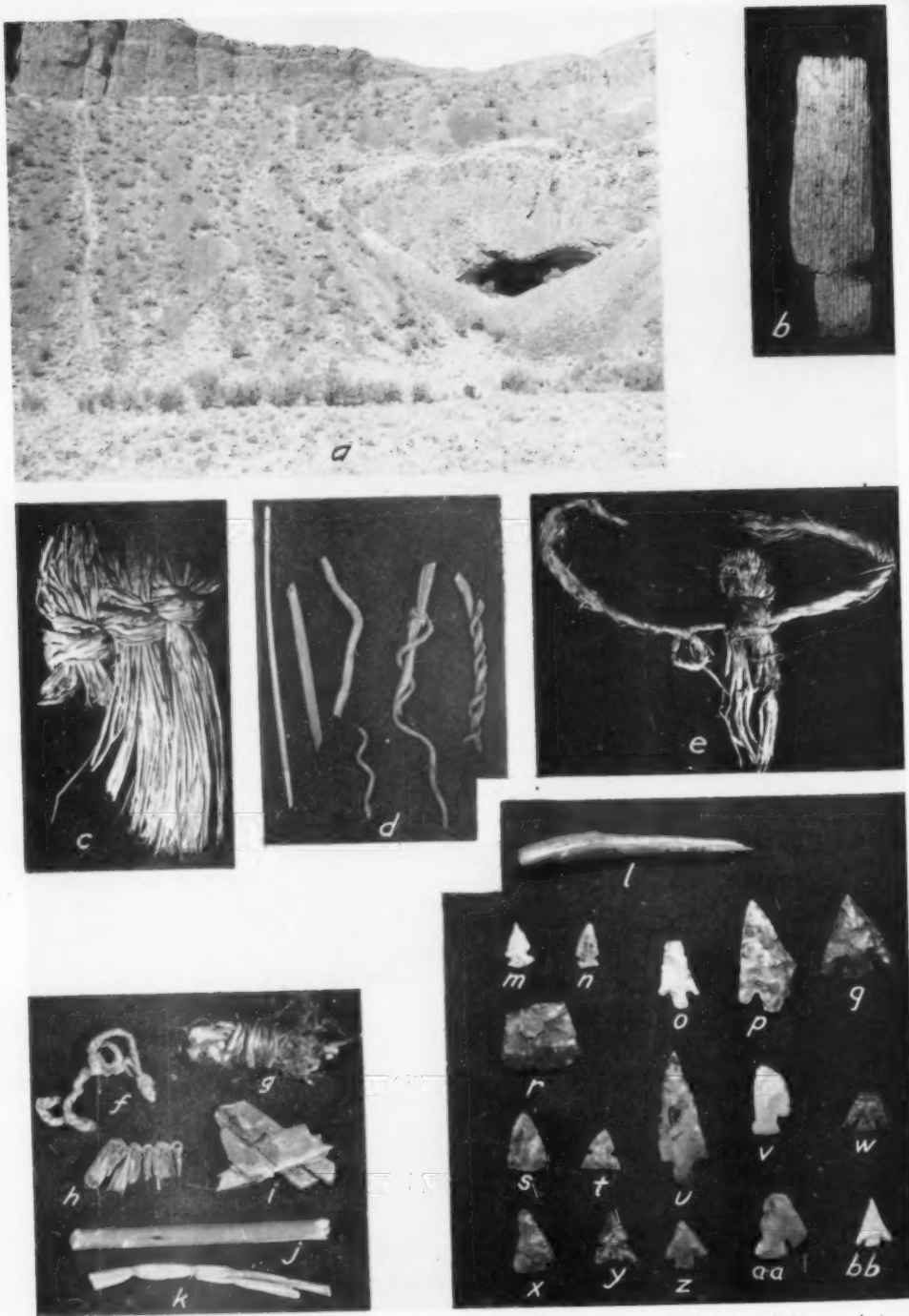

FIG. 107. *a*, 45GR2 and coulee wall, looking west; *b*, end of bow stave. All artifacts one-half natural size; *c*, twined grass matting, one-half natural size; *d*, sequences in tule cord manufacture, one-half natural size; *e*, cedar bark cord, slipped granny knot, one-half natural size; *f*, *Apocynum* cord, two-ply S-twist, singles Z, part of square-knotted net; *g*, unspun, poorly separated *Apocynum*; *h*, tule mat selvage, twined with *Apocynum* cord; *i*, twilling of alder; *j*, tule stalk, part of sewed mat; *k*, tule stalk, part of twined piece; *l*, bone harpoon spur; *m-bb*, projectile points.

line was established on the profile map, bisecting the total depth reached from surface, and the recovered material considered high, medium, or low dependent on position to this line. In Table 14 the vertical designation of the types, with respect to the median line, is given.

TABLE 14. PROJECTILE TYPES AND THEIR POSITION

Type (Fig. 107)	Number Found	Vertical Position	Description
q-w-bb	5	High	Corner notch, short expanding stem, flat base, sharp or rounded barbs, broad.
u-z	5	High	Square-cut notches, rectangular stem, short or long.
aa	4	Low	Corner notch, expanding stem, convex base, broad.
o-p	2	Low	Corner or basal notch, rounded barbs, small straight-sided stem, flat base, elongate.
r-s	3	High	Triangular but with convex base.
x	1	Low	Triangular, incurving sides.
t	1	High	Triangular, high side notches, broad, small.
n	1	High	Triangular, side notches low, flat base (this point slightly broken), small.
m	1	Medium	Triangular, side notches low, convex base, small.
y	1	High	Side notch, high concave base, small.
v	1	Low	Oval, corner notch, expanding stem, flat or convex base.

Most of the points were found in the upper zone. The *q-w-bb* type, the most numerous and restricted to the upper zone, is a type found, with local variations, throughout the plateau. Actually, the same may be said for all of the types shown. The hints of point type change in Table 14 from low to high in the deposit should be kept in mind for future studies but as indications only. They are not worthy of exploitation now.

Non-stemmed triangular points composed 24% of the total collected, stemmed points the remainder with the exception of one leaf-shaped specimen. The average length of the non-stemmed points was 19.6 mm.; stemmed averaged 27.2 mm. These figures are opposite to Lower Columbia archaeology, where non-stemmed correlate with larger sized points and stemmed with smaller (Strong et al., 1930, pp. 79, 82-3). The preponderance of stemmed points agrees with those from the neighboring Chief Joseph reservoir.

Obsidian and basalt materials were used in the manufacture of *q-w-bb*, *u-z*, and *y* points respectively. Obsidian is rare in the area; it is probably part of trade from the south. The 39 scrapers and worked flakes recovered were randomly distributed and are consistently in the form of single flakes with one or more edges retouched. Two specimens are obsidian, one is quartzite, with the remainder chert.

The only non-chipped stone found included a small, pear-shaped granite hammerstone and two fire-blackened cobbles, that may have been used for boiling stones.

There were several wood artifacts. What appears to be the end fragment of a simple bow stave (Fig. 107, *b*) was found close to the surface. Manufactured from western red cedar (*Sugi gigantica*), it is 9.8 cm. long, 3 cm. wide, and 5 mm. in breadth. The tip projects 2.5 cm. above the shoulders, and the nock is encircled by a single piece of string (*Apocynum*, 2-ply S-twist, loose, singles Z). Elliptical in cross-section, the body has smooth, flat sides and tapered edges. The simple, as well as the sinew-back and elk rib bow, was used historically by the Nespelem and Sanpoil (Ray, 1932, p. 87).

A possible arrow foreshaft or fish spear is a cylindrically-shaped wooden piece 7 mm. in diameter and 10.7 cm. long. One end is rounded, the opposite tapered to a point, and the body surfaces are ground smooth. A similar piece, located previously, has been identified as a lance or spear point (Collier, et al., 1942, p. 77. Pl. VIII*b*).

Ten small wooden twigs, ranging in length from 3.5 cm. to 14.7 cm., were found distributed from surface to base. Crude hacking is present on the tips, the only evidence of working. One long specimen, 31 cm., has had the bark removed from the body. Similar type artifacts, found in a dry cave near Honey Lake, California, were suggested as game counters (Fenenga and Riddell, 1949, p. 212). The sharpened twigs described above may have served the same purpose.

The distal end of an awl may be represented by a wood splinter 4 cm. in length with a slender, tapered, polished point, recovered

near the surface. A small tear-shaped peg, 2.3 cm. long, has one end rounded, diameter 10 mm., the opposite end tapered to a point. The body is smoothly polished.

Two fire hearths were found together, located near the median line. Both are rectangular, square-sided, and smooth surfaced. The largest, 14.7 cm. long and 1.7 cm. wide, showed partial fire consumption on one side. The breadth of the specimen is 1.3 cm. One end is fractured, the opposite grooved, evidently the remnant of the drill pit. The smaller fragmentary hearth is 2.9 cm. long, 1.5 cm. wide, and 10 mm. in breadth. The center surface is marked by a drilled hole, 11 mm. in diameter and 7 mm. deep. The two fractured ends have grooves running the entire breadth. Both specimens are fire-blackened and made of soft wood.

Figure 107, *l*, illustrates a harpoon spur found near the surface. The over-all length is 8.6 cm.; the central channel is broken by a medial ridge 3.3 cm. below the socket end. The pointed barb end is partially fractured. The outside surface of the socket tip bears two notches, each extending 1.5 cm. below the tip and separated by a center ridge for hafting. Four tip fragments were the only evidence of splinter bone awls. They were too fragmentary for faunal identification. A decorated bird bone tube, 1.8 cm. long and oval in cross-section, 9 mm. by 7 mm., is marked by two parallel, circumscribed incised lines on the center surface; it is probably a gaming die.

One bead is a fragmentary dentalium shell; one is of unidentified shell, 6 mm. in diameter and 1 mm. in breadth, center perforated; the remaining three of the five recovered are wood. The largest of these latter is 7 mm. long, 5 mm. in diameter, and contains a biconical drilled perforation. The two other beads are flat, center perforated, 4 mm. and 2 mm. in diameter.

The rear wall of the shelter is decorated with eleven pictographs. These are illustrated in Figure 106, with the exception of one that was too indistinct for description. Four of the figures are marked by white paint; 6 by red which is probably hematite. The "rake" design (*g*) is not an uncommon decoration of pictograph and petroglyph art style in the western states (Steward, 1929; Cressman, 1937). A striking parallel of the complex design (*i*) is seen in the design of a petroglyph found on the Murphy ranch in Oregon by Cressman (1937, p. 38).

Site 45GR2 yielded small quantities of a surprising diversity of perishable materials. Cordage was made of fibers; cedar bark (*Juniperus occidentalis*); alder (*Alnus*); sage bark (*Artemisia*); tule (*Scirpus*); *Apocynum*; and wool (awaiting identification). Matting fragments, fragments of netting, and miscellaneous objects were made from these materials and ryegrass (*Elymus condensatus*). These fragments were in such small quantity and of such small size as to indicate that the cave was probably not used as a dwelling place. The analysis of cordage and objects made from cordage follows. Tensile tests were made on all non-friable specimens of a minimum of four to five inches in length.

The cordage shows the most diversity and some interesting correlations. There were five specimens of cedar bark (*Juniperus occidentalis*) cord or rope: of these four were twisted; the fifth was an untwisted bundle of fiber tied into an overhand knot. In all there were:

Single-ply, Z-twist (O'Neale, 1948, pp. 114-5)	2 specimens
Two-ply, Z-twist	2 specimens
Singles, S-twist	2 specimens
Degree of twist	Very loose–medium
Diameters	⅛ to ⅜″
Lengths	7–10″
Tensile test of one specimen (YR2/126, ⅛″ diameter, 2-ply, Z-twist, loose)	16 pounds

In all cedar bark cordage the fibers have been only partly separated from other tissue; probably only an initial shredding procedure was used. In all specimens the single plies are very loosely twisted.

One specimen of the twisted cedar bark cordage (Fig. 107, *e*) shows subsequent and problematical use. Two pieces have been tied in a granny knot with the knot slipped so that the elements are not parallel. This same turned-over granny knot has been tied in one tule specimen and in a sage bark specimen. The identity of the knot in the three specimens suggests that the over-turning or slipping is not fortuitous.

Sixteen specimens of tule (*Scirpus*) cord were recovered. With two exceptions tule cordage is two-ply, Z-twist, with the singles S-twist. The degree of twist seems to be loose-

to-medium, but the plies in the cordage are so separated at the present time that the measure of degree may not be accurate. The same disarticulation makes the measurement of diameter difficult. The cords range about one-fourth inch in diameter, with some obviously finer, probably nearer one-eighth inch. Because of the short lengths, no tensile tests could be made. The separation of the two plies may well be caused by shrinkage in drying. The tule twisted when green was undoubtedly a closely twisted cord. One of the two exceptions is the tule cord used to twine the ryegrass matting. The other is a long (*ca.* two feet) length of two-ply Z-twisted tule cord, or more properly rope, each single of which is three tule stems very slightly S-twisted. The final twist is loose. The whole is coiled as if ready for use.

No tule cordage found shows a method of achieving continuity of cord by joining the individual tule lengths together. All pieces are separate stalks, ranging from one inch to two feet in length. No fiber separation from tissue is evident. Figure 107, *d*, shows untwisted tule fiber, S-twist singles and the final Z-twist cord.

Lengths of untwisted *Scirpus* show evidences of having been sewed (Fig. 107, *j*) and of having been held by constricting cordage in a method such as twining (Fig. 107, *k*). Sewing or twining cords were found in only two specimens of matting. The selvage binding cord of one specimen (Fig. 107, *h*), however, is of *Apocynum*. In this specimen individual stalks of tule warp are held in a tight selvage by a row of twining of *Apocynum* two-ply weft. The method of folding over of the tule appears to have been as follows: Each single stem was placed in perpendicular position with approximately one inch within the selvage of the matting; the cord twined around the short length; the entire remaining stem was then folded over, and a second twining stitch held it as a warp firmly in place. None of the selvage fragments have any succeeding rows of twining or sewing, but a tule stalk approximately three inches long (Fig. 107, *j*), found with the selvage, is perforated by a small slit three-eighths of an inch long by one-sixteenth of an inch wide. The possibility of the use of a "mat needle" and "creaser" is negated by the small size of the slit and the lack of constriction on the exterior of the tule warp. No sewing thread is present, but the diameter of the hole indicates *Apocynum* cord rather than the heavier tule cord.

Many pieces of untwisted tule show the regular constrictions due to twining (or of holding by another binding technique). Only one had a twined cord in place; the cord was of single-ply *Scirpus*, twining was (viewed horizontally) up to the left.

One article of untwisted tule formed the same turned-over granny knot as the before-described juniper bark specimen.

One other knot is a half-hitch thrown over an untwisted tule stem by another untwisted stem. Both were short lengths only.

Four pieces of cordage were made from narrow strips of alder bark. (No attempt was made to separate fiber from tissue.)

Single-ply, S-twist (Has overhand knot tied in it)	1 specimen
Two-ply S-twist	3 specimens
Singles Z-twist	3 specimens
Degree of twist	Loose
Diameter not measurable	
Tensile strength—insufficient lengths for tests	

The only specimen of twilled mat or basket (Fig. 107, *i*) is made of one-half-inch-widths of alder bark, diagonally twilled.

Eleven lengths of sage bark cord were found; all were exceedingly short except one which was of sufficient length for tensile test. One untwisted bark article exhibits the slipped-over granny knot.

Single-ply	
Z-twist	8 specimens
S-twist	1 specimen
Two-ply	
S-twist (singles Z-twist)	1 specimen
Z-twist (singles untwisted)	1 specimen
Tensile test (GR2/323; two-ply, Z-twist; ¼" diameter; loose)	14 pounds

In all specimens the fiber is barely separated and the bark strip singles are very loosely twisted.

The bulk of the cordage, as would be expected, is of *Apocynum*. *Apocynum* was prepared for twisting into cord in two ways: In four specimens the fibers have not been separated from the parenchymatous tissue; in three specimens the fibers have been almost completely isolated from the tissue.

Apocynum cord with fibers unseparated from tissue	4 specimens
Two-ply Z-twist (single S-twist)	1 specimen
Two-ply S-twist	3 specimens
Singles Z-twist	2 specimens
Singles S-twist	1 specimen
Degree of twist	Loose to medium
Diameter of cords	⅛ to ¼"
Lengths of cord	4" to 10"
Apocynum with separated fibers	3 specimens
Direction of twist	
Two-ply S-twist (Fig. 107, *f*)	28 specimens
Singles Z-twist	27 specimens
Singles S-twist	1 specimen
Two-ply Z-twist	2 specimens
Singles S-twist	2 specimens
Four-ply S-twist (singles Z-twist)	1 specimen
Degree of twist	
Loose	3 specimens
Loose–medium	5 specimens
Medium	14 specimens
Medium–hard	6 specimens
Hard	3 specimens
Diameter of cord	
1/32 inch	5 specimens
1/16 inch	16 specimens
⅛ inch	8 specimens
¼ inch	2 specimens

Lengths range from one inch to twenty-one and one-half inches in the two-ply cord; the four-ply cord was twenty-five inches long.

Tensile tests were made on one two-ply cord (S-twist, medium-hard; 1/16 inch diameter): six pounds minimum. (Cord broke at the jaws of the testing machine, so accuracy cannot be certain.) On the four-ply cord (S-twist, hard, 1/16 inch diameter) length permitted two tests, both nine pounds pull.

Apocynum cord was used in twining the selvage of the tule mat. Two brief lengths of cord have square knots and were probably sections of nets. Figure 107, *f*, illustrates a three-knotted section, with crimps showing where a subsequent row of knots may have been attached. No sheetbend knots were found; only square-knot netting appears to have been present.

A piece of *Apocynum* cord was used in sewing a piece of moose (?) hide with hair attached; three short running stitches show on the hide side, and the cord reappears in the hair. The object was too fragmentary for identification.

A piece of very fine cord, a bow cord perhaps, lies around the nock of the bow fragment (Fig. 107,*b*).

One small bundle of *Apocynum* fiber, neatly rolled and with a half-hitch thrown around it, was possibly a bundle made ready for spinning (Fig. 107, *g*).

A two-inch piece of what appears to be single-ply (Z-twist) hand-spun wool (species awaiting identification), approximately one-sixteenth inch diameter, was found.

Three pieces of twined matting of ryegrass (*Elymus condensatus*) were found. In all the warp consists of untwisted bundles of the grass, one-fourth to three-fourths inch diameter, and the twining (viewed horizontally) is up to the left. In one matting the weft is untwisted bundles of ryegrass; in the second slightly S-twisted bundles of ryegrass (Fig. 107, *c*); in the third single-ply tule was used. The selvage of one specimen is identical with that of the tule matting.

In a consideration of technical aspects, of greatest interest in the cordage analysis is the complete change-over in the twist from cedar bark and tule cord (invariably Z-twist) to the *Apocynum* cord (almost invariably S-twist) and alder (also predominantly S-twist, although the short series of specimens have eliminated it from the present discussion).

Two-ply cords which are thigh-twisted are usually made in the following manner: Two bundles of fiber are laid parallel crossing the thigh. The spinner then with her hand rolls the two bundles simultaneously, keeping the bundles separate during this twisting. A brisk movement in the opposite direction immediately following the twisting of the single plies unites the plies and produces a two-ply cord with singles twisted in one direction and the two-ply final cord in the opposite direction. An initial downward movement of the hand for twisting the singles, followed by a brisk upward movement to unite them, results in the common tule-type; i.e., singles S-twist and two-ply Z-twist. The opposite movement, i.e., an initial upward twisting followed by a downward push to unite the plies, produces the common *Apocynum* twist; two-ply S-twist with Z-twist singles.

The twisting of different fibers in opposite directions is not unique in the Upper Coulee rock shelter. Amsden noted that in the cordage of Gypsum Cave, *Apocynum* was almost invariably two-ply S-twist, while yucca cord was almost invariably Z-twist (Amsden, 1930, and Harrington, 1933, pp. 158-60). As Amsden says, the facts "are in themselves interesting. The reasons behind them, when disclosed, may prove important."

The few tensile tests made so far on archaeological cordage seem to indicate no difference in tensile strengths of S-twist as against Z-twist cordage. Results of this testing are, however, decidedly limited in number, and their validity is further handicapped by differing age and preservation of the specimens and sufficient numbers of specimens of equivalent angle of twist, degree of twist, and diameter. It is felt at the present time that the differing angle of twist in the tule-cedar bark and in the *Apocynum* cordage from 45GR2 will have a cultural basis rather than a technical basis. A change in motor habit does not appear to result in the production of a superior cordage.

In the analysis of cordage, comparative material is difficult to locate. The same plea for accurate recording which Amsden made in 1930 can be reiterated in 1951. Collier, Hudson, and Ford (1942, p. 100) state that the twisting of two-ply cord (cedar bark and Indian Hemp, i.e., *Apocynum*) is always clockwise [i.e., right or Z-twist], yet the illustrations (p. 107) show two-ply S-twist, the common twist for *Apocynum* cord in the Upper Coulee. In this case it appears that the authors have used the motor habit to designate final twist. There is thus sufficient doubt in this respect to warrant rejection of the Grand Coulee material for comparative purposes. The cedar bark cord and *Apocynum* in the Upper Columbia sites were stated to have the same angle of twist; in the Upper Grand Coulee shelter the situation was, as has been stated, the reverse. No *Scirpus*, sage bark, or alder bark cordage is reported from the Upper Columbia.

The diversity of types of materials used in cordage is rather remarkable. Cordage as well as all woven fragments from a site near Umatilla, Oregon (RBS—45BN3), was made of *Apocynum* fiber (both separated and unseparated fibers). No other material was identifiable. Ninety-five out of one hundred eighteen two-ply cords from Umatilla were two-ply S-twist.

Comparing data from 45GR2 with data taken from Ray (1942), we found some interesting facts of distribution. On the basis of 14 traits there is total information only from the Thompson. This tribe splits the lists with seven negatives (denied traits) and seven positives. The remaining tribes fall roughly into three groups: (a) Kutenai, Lillooet, and Chilcotin share the least traits with the 45GR2 dwellers and have the most negative correlations. (b) Kittitas, Wenatchi, Tenino, and Klikitat follow. (c) Flathead, Coeur d'Alene, Shuswap, Sanpoil, Kalispel, Carrier, and Umatilla are most similar. Thus, with the exception of the distant Kutenai, the tribes which are least like 45GR2 in the traits considered are western Plateau and/or partly dwellers in the Cascades or on coastal flowing rivers. The third group is northern Plateau, with the exception of the Umatilla. The Umatilla, in spite of the peculiar denial of two-ply cordage (found archaeologically in their area in 45BN 3) has an assemblage most like that from the rockshelter. Although the lacks in data and possibly method are recognized here, it is proper to follow the indications to a logical conclusion and suggest that there may be an underlying connection between the simple techniques of the Grand Coulee-Chief Joseph hinterland of the Plateau and the Sahaptins.

It appears that site 45GR2 may well have been occupied by either the Nespelem or their eastern neighbors, the Sanpoil. It is difficult to assign a historic or prehistoric period to the site, though contact material was lacking below the surface, which contained scattered picnic refuse. Using the arbitrary system, previously described, of temporal placement of artifacts, no appreciable change of artifact types was noticed, other than the grouping of the majority of projectile points in the upper level. The site itself was, without much doubt, a camping shelter for small parties and was never a dwelling place.

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ARCHAEOLOGICAL INVESTIGATIONS IN THE CHIEF JOSEPH RESERVOIR*

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CHIEF JOSEPH Reservoir is located along the Columbia River in southern Okanogan County, Washington (Fig. 108). The general area is a rugged highland, underlain chiefly by pre-Tertiary resistant rocks, and marked by well-defined north-south mountain ranges separated by broad troughs, now well dissected, into which the present main tributary streams, such as the Okanogan and the Sanpoil, have cut deep narrow trenches to the Columbia. The highland, whose summits reach 7000 and even 8000 feet at the international boundary, slopes rather uniformly south and passes beneath the broad expanse of the Columbia Plateau, where flat-lying mid-Tertiary basalt flows conceal the older rocks (Flint, 1935, p. 171). Along the river the country is rather barren of flora and fauna, except for sagebrush and an occasional clump of pine trees (Fig. 109, *a*). Several miles north of the river the pine forests begin and extend north into Canada.

Thus, fast water, steep banks, and minor tributaries characterize this area (see Fig. 108). The absence of an extensive flood plain has mitigated the historical record in two ways: Less occupation, or certainly less permanent occupation, is to be expected in such a valley, and the lack of space for flood waters to spread out and consequent channeling of the torrent has increased the washing and attendant removal of cultural deposits. All of the sites excavated and most of those found were on the north side of the river. The banks on the south side were uniformly more steep. Such occupation areas as were found on the south side were not considered worth excavating, in comparison to their northern neighbors. It is perhaps a commentary on the destructiveness of the river or on the temporary nature of occupation in the region that only 8 or 9 of the 15 historic sites that Ray (1936) lists were located archaeologically.

When the first explorers and traders came into this area, it was occupied by several groups of people all of whom spoke a dialect of Interior Salish. In the specific area of our concern, the same dialect of this language was spoken from the mouth of the Okanogan to the Spokane River along the Columbia. The Interior Salish located in this area are now known as the Southern Okanogan, the Nespelem, and the Sanpoil. All were culturally very similar, with the last two identical in most respects. These people engaged mainly in fishing along the Columbia from May to August for sturgeon and small fish and for salmon from the early summer on. During the early fall hunting, root gathering, and fishing for silver and dog salmon filled the days. This was a period of activity, and the people roamed widely. About the middle of October, with winter approaching, the winter villages along the Columbia River and its tributaries were reoccupied and prepared for the coming months. During the winter, because of the severity of the weather, it was necessary to spend most of the time inside. The men spent this in sleeping, gossiping, and gambling, with occasional hunting trips if weather permitted.

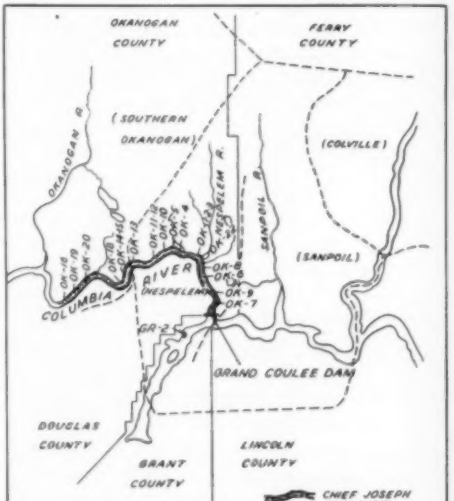

FIG. 108. Site, tribal, and reservoir map of North Central Washington.

* George Cheney and Samuel J. Tobin, University of Washington graduate students, working student crews from Washington and other universities excavated the sites herein reported during the summer of 1950. The work was directed by Douglas Osborne.

The women made mats, baskets, clothes, and prepared meals. The monotony of this season was broken by the ceremonial season, during which guardian spirit songs were sung and shamanistic performances were executed. March saw a renewal of economic activity with the breaking of winter. During this time the men gathered shellfish and hunted birds and rabbits, and the women gathered edible roots. In the following month the group gradually moved to the area south of the river to gather roots for the summer. This was followed by the fishing season. The dominant trends of the culture of these people were pacifism and the equality of men, which is in contrast to the class system of the coast and the emphasis on bravery in warfare of the Plains people. This area is regarded as the one the least affected by outside influences and the one which represents older levels and fundamental aspects of Plateau culture (Ray, 1933, pp. 25-9; Ray, 1939, p. 149; Cline, *et al.*, p. 86; Ross, 1923, p. 308 seq.).

In the early part of the nineteenth century, fur traders for Hudson's Bay Company and the Northwest Company began to explore this area. In 1811 David Thompson made a trip down the Columbia River by boat from the mouth of the Spokane River to the Pacific Ocean, and on July 5 of that year he stopped for a night near the Nespelem River, where he visited with some of the Indians he met there (Thompson, 1916, p. 468). This is probably the first contact that most of these Indians had directly with any of the whites, and it is more than likely that Thompson and his men camped very near 45OK2. In the following September a fort was established by the Pacific Fur Company (Astor) at the mouth of the Okanogan River. In 1814 this company sold out to the Northwest Company, which merged with the Hudson's Bay Company in 1821. Fort Okanogan was important as the gateway to Kamloops and New Caledonia (southern and central interior British Columbia); it was a storage depot and horse-rendezvous. The fort was maintained until about 1860, when it was finally abandoned. Meanwhile, the Indians of the Okanogan country went on living much as they had in the past, relatively unaffected by the white intruders. By 1883 they had been placed on the reservation now known as the Colville Reservation. But even after that there were few settlers among them till after 1900.

45OK1

The single house pit of this site was quarter-trenched. Two five-foot trenches included the northwest quandrant. While there could be no doubt that the depression was a house pit, it showed none of the usual evidence of occupation and many fires. Two areas of bones and cobbles, cooking or feeding remains, were the only evidences of intensive activity. Stratigraphy, too, was simple. A white volcanic ash subsoil was overlaid by a soft gray-brown loam, which shaded into a hard-packed gray sandy loam at and near the surface. No trade material and only four aboriginal artifacts were found. These were a micaceous quartzite chopper, fragments of bone awls, and a piece of an antler tool, probably a flaker.

45OK2

45OK2 is about 17 miles downriver from the Grand Coulee Dam. It is one of the larger sites of the area. Fourteen house pits are strung along a low bench above the Columbia for at least one-half mile. Their size variations may be taken from Table 16.

House Pit 1

Again, pertinent data are meager. The profiles of house pit 1 (and indeed of most of the others) fail to indicate a definition of the sides of the house pit. Whether or not this reflects slipshod construction or soil movement is indeed questionable. Pit outlines have been difficult to locate elsewhere; it would appear that most of those excavated in Chief Joseph were not carefully excavated nor fashioned. Withal, house pit 1 has a rather complicated stratigraphy. Five layers, with subdivisions, were isolated. These include the back thrown earth. All have a smooth down-drift across the profile and indicate a saucer-shaped depression without steep side walls. The strata are all darker or lighter sandy loams. Charcoal, gravel, or humic contents vary. Artifacts were not numerous. A shale pipe, carved in the outline of the popular clay pipe, with resting projection on the base, was found in an intrusive pit in square 11R8. It obviously dates from a late occupation. A rusted food can of an older type, with recessed bottom, was found deep in the deposit in a central square. Disturbance was present there as well; parts of rotted timbers (feature 3), which

FIG. 109. *a*, Typical section of Columbia River in Chief Joseph Reservoir, site 45OK10, house pit in center across road, toward south; *b*, section of typical profile 45OK2, house pit 1, square 11R6; *c*, view of area, site 45OK5, house pit 1, staked toward southwest; *d*, 45OK11, house pit 1, feature 1, typical fire area of fire-cracked rock, boiling stones, charcoal.

yielded no pattern, were also found. Snub-chipped scraper flakes of jasper and chalcedony (Fig. 110, *z*) and a small diagonal notched projectile point of gray chert with a short expanding stem (Fig. 110, *v*), plus a few broken fragments of worked bone, probably awls, were all of the artifacts found.

HOUSE PIT 2

This large depression (35 by 36 feet) was extensively test-pitted. The profile was typical, though shallow. The topsoil was a sandy, gray loam about .2 foot thick; below that lay a harder gray sandy loam layer about .4 foot thick. This was followed by a soft brown sandy loam of the same thickness. The occupation layer, about .6 foot deep, came next. It was, essentially, a heavy ash and charcoal, shell and bone concentration in the usual sandy loam matrix. The subsoil is sterile, gray, gravelly sand. Machine-cut square nails occurred in the upper three layers, above the principal occupation level. Two granite choppers and spades (Fig. 110 *q*), a scraper or crude blade of micaceous quartzitic gneiss, several retouched flakes, scrapers, or edged implements, and two projectile points, one oval or leaf-shaped (Fig. 110, *y*), the other short with diagonal notches and a short expanding stem, were found in the occupation level. No true floors were found in any of the house pits.

HOUSE PIT 3

This depression was test-pitted. Time and money were pressing considerations. To the present no American Plateau house pit with either burned or buried structural parts present in quantity, has been found or properly excavated and reported. The search for such evidence was considered important; hence the regular testing, instead of trenching of house pits. The stratigraphy of house pit 3 was more complex than has been recorded for house pit 2, but the order and character of the soils were similar. The eight strata include a yellow sandy subsoil, several layers of brownish loam, and a sandy humus at the top of the four-foot profile. The primary and principal occupation layer appears to have been, again, immediately above the subsoil.

Artifacts were rare; two flake cutting-edges or scrapers, one chalcedony and one white quartzite, a small jasper triangular point with a slightly concave base, and a gaming bone (Fig. 110, *s*) were all that were found. All were from the main and first occupational layers.

HOUSE PIT 4

Simple, three-part stratigraphy characterized the profile of the 15x35 foot trench that was excavated through this house pit. The central stratum and part of the pit carried a concentration of occupational debris. Earth thrown back from the pit during the original excavation appears to have drifted back into the pit after its first use or during use—an indication that the house pits were not well kept or were temporary structures. Only one artifact, a projectile point, was found. It is of chalcedony, small, with corner or diagonal notches and a short straight stem.

The reason for the expansion of the test into a trench in this house pit lay in the discovery of three features. One, a stone hearth with extensive charcoal accumulation, was found at the extreme edge of the pit, at a depth of one foot. It appears not to have been associated with the main period of occupation of the house. The features were, collectively, a concentration of charred and decayed timber about two feet below the surface. The pieces lay at what might well have been the edge of the pit itself and were presumably superstructural remnants. Unfortunately, no structural data nor pattern could be gleaned from them.

HOUSE PIT 5

Five appears to have been occupied relatively recently. It was small, 15.5x18.5 feet east-west, and shallow. A single trench, 3 feet wide and 25 feet long, was excavated along the north-south axis. The fill of this pit was raised in the center. Thus, instead of a smooth saucer-like cross-section, the section of the pit shows a definite humping in the center. It was hoped that this indicated a fallen roof and buried superstructural elements. Again, the digging crew was disappointed.

Four strata, with substrata, show on the profile. The pit apparently was excavated in disturbed soil. Charcoal was found below the main occupational level, and true sterile subsoil was not encountered. Above this a loam with heavy charcoal inclusions and above that a rather tenuous band of dark sandy loam, which often intruded as pits or lenses into the

loam with charcoal below it, formed the principal dwelling level. The topsoil, a powdery loam, was next. This pit was used wholly during a period, a relatively recent one, of contact. The main level, the second and third strata, was well seasoned with trade artifacts. Three square nails, probably machine cut; 215 varied beads: seed, pony, Cornaline d'Aleppo, large blue beads, etc.; one .45-.70 and four rim-fire .38 cartridges; an old type celluloid comb; some metal scraps, a metal can, and an 1893 Canadian dime were found. (This coin is so thoroughly worn that nothing of the date and little of the figuring was discernible. It was taken to the Seattle Police Department laboratory, where the same process as that used in recovering serial numbers which have been ground or filed from the engine blocks of stolen automobiles was employed for bringing out the characters, with perfect success. It can be used in any situation where stamping of numbers or designs has altered the superficial molecular structure of the piece.)

Stone artifacts were not inspiring: several flake cutting edges or scrapers of agate, jasper, and chalcedony; four projectile points of chalcedony, two broken, all small. One is deep side-notched and has, consequently, a sharply expanding stem. The other is corner-notched with a short expanding stem and convex base (Fig. 110,*u*).

The point of a bone awl and a granite chopper also were found. Nearly all artifacts were in the living zone. Late fill and bottom soils were sterile. The dime, when one considers its worn condition, must indicate a late nineteenth-early twentieth century use. Local informants stated that the Indians had used the area regularly a couple of generations ago. The mixture of native and traded objects, together with the late date, shows conclusively that local Indians retained many of their older cultural usages as late as 50 or 60 years ago.

Fire pit remains were found centrally located. Most of the artifacts were associated with these features.

House Pit 8

This large pit, 50x46.5 feet, was quarter-trenched. Two trenches, the east-west 25 feet and the north-south 30 feet long, intersected at the center of the pit.

Stratigraphy was not unusual. The bottom level, four feet below the surface, is not sterile; one point (unstemmed) was found in it, and flecks of charcoal were present. Above, a deep band of sandy loam with charcoal comprised the main fill. A substratum, which showed strongly on the south wall profile, contained an especially heavy content of charcoal, shell, and bone fragments. It was, no doubt, part of the debris of the living level. The darker stratum, usually occurring midway up the profiles in these house pits, was generally interpreted as representing occupational levels rather than post-occupational dumping. The soil content and position favored this interpretation. Floors were not found. Humus and silt in a thin band capped the deposit and followed the contour of the depression.

Artifacts found in this pit varied somewhat from those discussed so far. Projectile points or small blades were often not stemmed. A small lozenge-shaped point, with one point squared off as a base (Fig. 110, *t*), a large slightly convex-sided triangular point (Fig. 110, *x*), and one with an expanding drill-like base and incurving sides (Fig. 110, *w*) were present. These are all types found both in the Grand Coulee Reservoir (Collier, et al., 1942, Pl. II) and in the McNary Reservoir near Umatilla, Oregon. Several fragments of large blades, of both basalt and white chalcedony, occurred. The stemless points and blades suggest that this house pit was inhabited by a family from outside of the local area. Enough, however, is not yet known of the distribution of particular types of artifacts in the Columbia area to support serious suggestions as to local movements. Trade material was absent in house pit 8.

House Pit 12

This pit is 40 feet east-west by 21 feet north-south. It was cross-trenched along both axes. Simple stratigraphy: a nearly sterile sandy subsoil, a dark loamy sand with included ash and charcoal areas or lenses, and a broken silty-loam superficial covering, characterized the profiles.

The elongate, A-frame, mat-covered, often multi-family house was rather certainly the preferred type of more ambitious house in the ethnographic Plateau. House pit 12 is, without doubt, the shallow remaining remnant of such a house. Its recency is attested archaeologically by a riveted harness fragment in the living stratum. Furthermore, the thin humic, light sandy loam or silt capping that mantled the deposits

of all other house pits and was interpreted as the post-occupational grass-roots accumulation, was particularly sketchy on this pit. While uniformly covering the lower parts of the depression, this superficial layer was not present along the edges or sides. Apparently, had the pit been older, there would have been complete coverage.

Artifacts were, other than the piece of harness, nondescript; a broken short pestle of micaceous quartzite, a hammerstone, a chopper of granite, chips, and a perforated mussel shell were all that were found. This lack of aboriginal artifacts is probably due to late occupation of the house, although house pit 5, also very late, was well supplied with trade material. Obviously, both the elongate, presumably mat house, and a rounder type, probably also a mat house, both with shallow pits as floor area, were in use during the most recent native inhabitation of the area. Nowadays, the reservation Indians nearby have frame houses for permanent living and employ the canvas-covered tipi when setting up a temporary residence.

45OK4

45OK4 lay about one-third of the way down the valley from Grand Coulee Dam, just below the confluence of the Columbia and Nespelem on a bench 50 to 100 feet above the river. Close below, the picturesquely named Deadman's Eddy provided an excellent fishing place.

At least three house pits, some pictographs, and poor midden deposits made up the site. Three test pits were excavated and two house pits trenched. Test pit profiles indicated that there might have been a fairly extensive period of occupation, but the midden content was so thin and artifacts so few that statements as to developmental sequences are not warranted. Charcoal layers or lenses and shell layers were encountered two to six feet below the surface, often with deep bands of sterile or nearly sterile soil above them, but nearness to the river and the impermanency of the soils there leave no alternative suggestions open to the field interpretation of relative recency. As was stated, artifacts were not numerous enough to support an ordering study. Granite choppers or heavy scrapers (of the type of Fig. 110, *q*) and scraping or cutting flakes with secondary retouching along one or several edges (of the type of Fig. 110, *n*, *o*, *p*) were found. Short, diagonally notched, short-stemmed points (like Fig. 110, *j*, *k*, *l*) and triangular points (like Fig. 110, *t*, *x*) were both used during the earlier and middle periods of the life of the site. Sixpenny nails were found in the upper levels in one test pit; worked bone was rare but present. Heavy tools, hammerstones, or pestles were usually of micaceous gneiss.

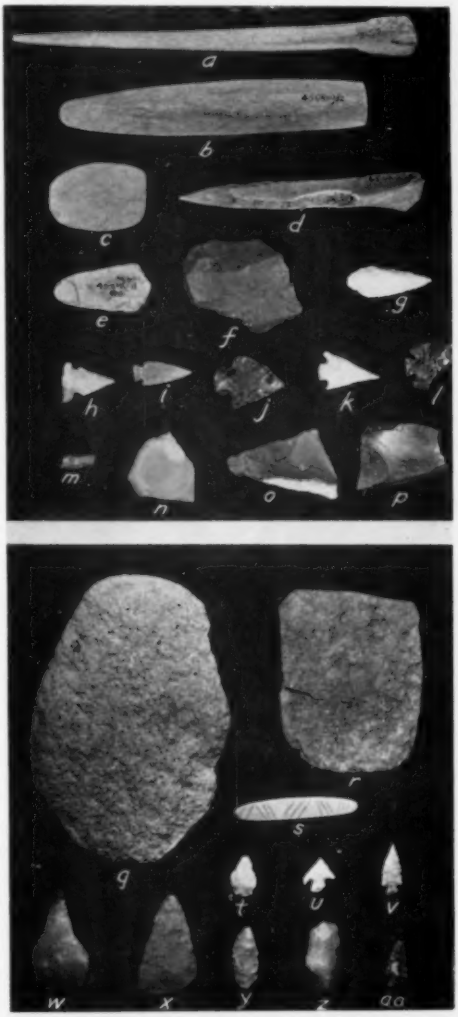

FIG. 110. Artifacts, Chief Joseph sites. *Upper*, sites 45OK5, 45OK10, 45OK11; *lower*, site 45OK2.

45OK5

Five house pits and sparse surface indications of middens were noted at the site. Eight test pits were dug in middens and in some of the house pits. Two of the latter, house pits 1 and 3, were thoroughly trenched. The test pits revealed no midden deposits worthy of extensive excavations. House pit 2 was test-pitted. As with other sites the house pits were not grouped, but lay along a terrace above the river and well back from the water in partially sheltered areas.

House Pit 1

The large depression was investigated by a 10x60 foot east-west trench. The profiles revealed the usual smooth, saucered contours of the underlying strata. Five, with substrata, were isolated. They varied from the light sandy subsoil, through the dark loam of the major parts of the fill. Lenses of soil, heavily filled with charcoal, ash, and shells of river mussels, were found throughout the house pit. These were, of course, areas where food refuse had been piled or dumped. The stratigraphy beneath the rim of the pit is the same in make-up, though not in relative depths, as in the central parts of the pit. The lack of reversed stratigraphy, as would be found in a dump, and of a clear-cut pit outline, would indicate either great age or careless or shallow excavation, possibly in a natural depression. The former is not likely.

Ten features were recorded. All are concentrations of kitchen refuse excepting one, a large stone. Four were areas of cracked bone, the remaining five were fireplaces or heaped fireplace debris. All were found on and are obviously a part of the occupational level.

A fairly definite floor area, at an average depth of 3.5 feet below the surface, was found centrally located. This central part, too, contained scattered remnants of several fireplaces at a similar level. No fire pits or special pits were prepared. A small, closely-contained fire in the approximate center of the house appears to have been the pattern. A large flat rock, possibly a seat or kitchen convenience, was at the side of the larger charcoal and refuse area.

Artifacts. A number of nails, four-, six-, eight-, and tenpenny square nails, were found only in the top soil. The unfortunate lack of artifacts makes it impossible to check the strata for age or to follow out the suggestion that the lower parts of the pit might be wholly pre-contact. The six projectile points, all from the strata with the heaviest inclusions of charcoal and ash, the living levels, were all small-stemmed with diagonal or corner-notches (Fig. 110, *k*, chalcedony). One basalt point, corner-notched and oval in shape, was found in the lowest stratum. Four scrapers of quartzitic micaceous gneiss, five flake scrapers or crude blades, and three end-scrapers (Fig. 110, *f*, green jasper, and *n*, chalcedony), a crude rhyolitic pestle, a hammerstone, and two limonitic concretions were all of the stone artifacts found. In general they were grouped in the house pit, centrally and at the mid-depth (stratum II).

Bone artifacts were few and generally fragmentary. Awl bodies and tips and antler tips made up the body of the collection. Two whole pieces, a bone pin (Fig. 110, *a*), and an awl, cut from the axillary border of the right scapula of a deer (Fig. 110, *d*), illustrated, are probably typical, if one may judge from the fragments.

House Pit 2

A 5 by 5 foot pit three and one-half feet deep tested the deposit in this pit. There were perhaps two occupations recorded here—a light early and a heavier later one. A dark layer with a number of round cobbles (possibly boiling stones) bisected the profiles of the test pit. The few artifacts found were not unusual. Figure 110, *j*, mossy carnelian, and *m*, flake, chalcedony, were found in this, presumably, occupation area. The corner-notched projectile point is typical. The fragmentary lamellar single flake may not be an intentional artifact.

House Pit 3

This pit showed, on its profiles, a rather more decided basin shape and a shallow but decided occupational level; strata II and III of five strata. The soil column runs from a yellow sand and gravel subsoil through the occupational level, followed by a wide dark loam band. The topsoil is, as usual, a light, silty band with a moderate humic content.

Artifacts were, if anything, more sparse than usual: a rhyolite and a quartzitic gneiss chopper, some retouched flakes, scrapers and cutting edges, very fragmentary worked bone material,

and only five small projectile points were found. Of the three whole points, two had square-cut corner notches and straight-sided stems, the third (Fig. 110, *g*, opalite) has an incipient stem. All were from the fill in or above the occupation level. No trade goods were found in this house pit.

There are suggestions of chronologic depth in site OK5. It had a somewhat better artifact yield, and there was no association of the heavier midden and trade goods, as was found at other sites. It is probably safe to conclude that the corner- and diagonal-notched points were part of the pre-contact picture. There is certainly no change in the architectural picture between earlier and contact sites except for the presence of the elongate (mat house?) pits. When excavated, they have always had trade goods in them.

45OK7

This was both a habitation and burial site. At least three of the pits were house remains, the others appeared to have been disturbed graves. The remnants of three burials were found. No information could be gained from them as to burial complex, but they did add a few scraps to the artifact record. Eight test pits were dug, one in the midden; the others tested disturbed graves and the small house pits. Stratigraphy was similar to that recorded for the previous site.

Artifacts fall into two groups, those found in the test pits and those from near or in the disturbed graves. Contact and aboriginal artifacts were present in both categories.

Tenpenny round nails, a "calico" glass paste button (a four-hole white button with decorative, tiny, red-filled pits on the surface), a silver-plated brass tablespoon with incised tree design on the bowl, and some rolled beads of copper were the trade artifacts found in the pits. Presumably, none were associated with burials; all were certainly *in situ*. Arthur Woodward, of the Los Angeles County Museum, suggests a date of the 1860's or '70's for the button and early twentieth century for the spoon.

A hammerstone and laterally two-notched net sinker, an olivella bead, some disc mussel shell beads, and fragmentary dentalia were also found in the testing and house pits. Dentalia, rolled copper beads, a piece of a bone harpoon spur, and a bone bead had been associated with burials. Two copper and two dentalium beads still contained bits of *Apocynum* cord. The net sinker is of a type that is numerous in the lower reaches of the Columbia and becomes rare as one ascends the river, presumably as fish-taking techniques varied from netting to trapping and spearing. The harpoon piece fits well into the up-river cultural context. Both burials and dwelling places of OK7 are obviously late.

45OK10

Five test pits were dug and one house pit was examined at this site. The test pitting failed in its mission to discover buried midden deposits in the site or structural remains in the house pits. Three house pits were found on the site.

House Pit 1

This house pit came tantalizingly close to providing some information as to structures. The few pieces of decayed wood do not, however, add up to anything structural. One piece of pine (?) board, found nearly two feet deep, does have three square, machine-cut (?) tenpenny nails in it. Another piece appears to have been planed.

Artifacts themselves were more numerous than usual, although the series is short: one small triangular point; three corner-notched points with expanding stem and straight base; two with square-cut notches and rectangular stems; eight with corner notches, expanding stems, and convex bases. Size variation is slight. All types, obviously, vary around the corner-notched and stemmed type. Secondarily flaked chips, some worked into rough blade forms and others simply edged, were present in all sites. It is possible that these simple cutting and scraping edges might yield something to detailed study. That is a problem for a period when collections have been enlarged by both vertical and horizontal additions.

Thus, house pit 1, with its two occupations, appears to have spanned the period of pre- and post-contact. The deteriorated planed timber and square nails no doubt belong to the later occupation. The finds were shallow, even for it. A large trade button of the type known as a sporting button, unusual in that the stamped design represents a personage (Wellington?) rather than a game animal or bird,

was found at a depth of one foot. It is English and possibly dates between 1830-1845. (Identified by Herman W. Williams, Director, Corcoran Gallery of Art, Washington, D. C.)

45OK11

Eight house pits, divided into two groups of four each, made up the site. The two groups were seven to eight hundred feet apart and might equally well have been considered separate sites. Four of the house pits were tested or partly excavated, three by large test pits and one (4) by a north-south trench. Other than the pits there was no artificial alteration of the vicinity. Midden areas of a quality worthy of excavation were not present.

House Pits 1 and 2

The two adjacent pits were close to the river on a sandy first terrace. They were examined by one trench, which bisected both depressions. The stratigraphy is simple and is the same in both pits. A sterile light sandy subsoil is succeeded by a dark sandy loam, and this is capped by a light sandy recent water and wind deposit.

Features were numerous. Seven fire areas and one dump of kitchen debris were found. The fire areas were usually associated with several fire-blackened stones, boiling stones, or fireplace supports. These features were generally centrally located.

Artifacts were fairly numerous. Of the four small projectile points, one was side-notched (Fig. 110, *h*, chalcedony), one was fragmentary, one stemless, and the last two (Fig. 110, *i*, chalcedony, and *l*, jasper) diagonal or corner-notched with a short expanding stem. Nearly all artifacts were from the central loam zone. Occasional inclusions of charcoal mark this as the living level. Other stone artifacts were largely fragmentary blades, retouched chips, scrapers, core parts, etc. Figure 110, *o*, chalcedony, and *p*, jasper, are typical of these generalized or fragmentary tools. Dentalium and mussel shell (disc) beads were present. The two cut ovals of scapula, probably deer (Fig. 110, *c* and *e*), may well have been gaming pieces. The house pits appear to have been wholly prehistoric. Neither showed a sequence of occupational or structural debris.

House Pit 3

This pit, near the first two, was test-pitted. The walls of the pit showed a three-part profile similar to that recorded for pits one and two. This similarity is, of course, partly an expression of the sandy first terrace into which the pits were dug. Only a base of a stemmed point and a canine tooth, possibly a pendant, were found. They were in the central stratum, which carried the occupational material.

House Pit 4

This depression was the first of the second group that comprises OK11; it was test-trenched. Five soil layers were noted: a light sandy subsoil, a shallow level with charcoal and ash in the center, and a very thin, dark, packed zone, which was interpreted as the living zone and floor level. This latter was at an average depth of one to two feet. It was capped by gray sandy loam a foot thick. A thin zone of fine silt, with included charcoal, succeeded the loam and was followed at the surface by a mottled light sand with silty zones. The upper zone of silt and included charcoal may be a second occupation. The fireplace, with its blackened rocks in the center of the pit, is large and centrally located. No artifacts were found; the pit was nearer water level than the others and was probably regularly flooded.

House Pit 5

This small pit was tested. No evidences of structure were found. The stratigraphy was simple: light, relatively sterile sand lay in the bottom 1.5 feet; above this in the center was a fire area. Mottled dark sandy loam and a thin layer of topsoil completes the profile. Seven of the eight artifacts, all chipped stone, came from the lower half of the upper layer or from around the fire area. The other was a near-surface find. Two worked chips, five typical stemmed points, and one oval point with a flat base, plus a badly fractured stone with a worked surface, possibly a grinding slab, completed the meager catalog from the house pit. No trade goods were found. The fireplace area yielded several sacks of animal bones. Blackened stones and a large flat stone were also found near it.

HOUSE PIT 6

This pit was partly removed by river erosion of the bank. A short test trench was excavated through the middle of the pit and perpendicular to the river bank cut. The stratigraphy revealed was similar to the preceding house pit 5, but was not distinct. A cooking area, a lens of disturbed loam with stones and a few bones, was found at one side. This, plus a few shells and charcoal areas, was all that indicated a dwelling. The only artifact found was a flake cutting edge or scraper.

HOUSE PIT 7

This pit, the last to be examined at OK11, was tested only. The usual triple stratigraphy of this river bank site was noted on the pit walls. A hearth and cooking area was found centrally located two feet below the surface. Only the tip of a broken projectile point was found.

45OK12

This site lay about 1000 feet downstream from the downstream unit of OK11. It had only three possible house pits, one decidedly smaller than the others. All three were tested; one depression was not a house pit, in another the pit was sterile. The test in house pit 2 showed typical stratigraphy with three sandy or loamy zones. The central one, as usual, held most of the occupational debris.

Only six artifacts were found: a jasper thumbnail scraper, a short bone implement (5 cm. long) with a rounded blunt butt and tapering point. This is the type of bone object that is often thought to be an arrowpoint. It is short for an awl but may have been a hook barb. Two points, one stemmed and one unstemmed; a bone bead; and a broken arrowshaft smoother or sander completed the inventory. Contact material was absent.

Table 15 presents a summation of the mammal bones found in the Chief Joseph Reservoir and in addition lists those from the Upper Coulee Rockshelter (45GR2). The number of specimens is given by site and genus.

For obvious reasons the bottom figure in each category is very much an estimate. In general, the table speaks for itself. There are, however, a few points that might be highlighted. The importance of *Odocoileus* is obvious. *Bison* is, in number of specimens, next, and *Ovis* follows. *Canis* (coyote) came next.

Freed points out that the number of deer cannon bones indicates that they, or the lower legs, must often have been brought in from the hunt, possibly with a view toward their later use as tools. This is plausible, but it is also possible that the method of transporting the carcass of the kill may be involved. Bone tools are too few, fragmentary, or altered to yield any indications of preferred materials. Of interest is a deposit of 12 deer calcanae and 12 astragali, found close together in the dwelling level of 45OK5, house pit 1. The bones, the only ones from that particular level, were in kitchen debris.

Bison material, incidentally, was present in small quantities in nearly all sites so far excavated in the Plateau. Kingston (1932) has brought together most of the historical references to bison in the area. There seems to be small doubt that a few isolated individuals, probably old bulls, wandered as far as the Coulee. Those animals, and the few bones carried home by hunters who traveled to the Plains, can easily explain the bison remains found. It should be mentioned that bones of this animal were found in sites and in associations both late (with contact material) and early (no trade material). The major share of bison bones came from 45OK5, house pit 1, in the central squares from one foot to five foot depths. No trade material was associated. The complete inventory of bison material from all sites so far excavated in the Plateau yields no indications of special selection of parts of the skeleton. Presumably, therefore, the bones found were not brought in over great distances.

Table 16 presents the artifact categories and preferred materials. The next Table, 17, gives the number of stemmed versus unstemmed points. All points, it should be repeated, are small to medium; most are small. (Determination of the various cryptocrystallines was made by William Sanborn, of the University of Washington.)

Jaspers and chalcedonies are preferred and were no doubt selected as material for points and small scraping and cutting tools and flakes. It is of interest that basalt was rather extensively used. Basalt fine tools and points form a complex that is continually functioning as

a sort of background disturbance in Plateau archaeology. Here in Chief Joseph Reservoir the basalt points are typologically, except for size in one instance, part and parcel of the run of points. Table 16 presents some variation from that given on p. 58 of Collier, et al., (1942). The argillite-shale-slate group was far less important in the Chief Joseph area than upstream in the Grand Coulee region. The chalcedony-jasper-etc., series far outweighs any of the others for the making of fine tools in both areas. Metamorphics and igneous rocks were preferred for the few heavier tools found in Chief Joseph, as can be seen in the bottom part of the table.

Non-stemmed points were more numerous in the Upper Columbia sites (Collier, et al., 1942, p. 63, Table 4). A strong reversal of this trend is found in the Chief Joseph sites not so far downriver. As has been said, small, short-stemmed, diagonal-notched points were preferred between the Nespelem and Okanogan rivers along the Columbia. This compares with the Dalles-Deschutes area and differs from the middle Columbia sites examined upstream from Umatilla, Oregon.

While the exposition in this report cannot be sufficiently detailed to illustrate it, it is true that, other than artifacts found in a living level or associated with a fire area, most artifacts

TABLE 15. MAMMAL BONES*

	GR2	OK1	OK2	OK4	OK5	OK7	OK10	OK11	OK12
Antrozous pallidus (pallid bat)	**6	.....	.....	.....	.....	.....	.....	.....	.....
	5	.....	.....	.....	.....	.....	.....	.....	.....
Mustela cf. frenata (long-tailed weasel)	2	.....	.....	.....	.....	.....	.....	.....	.....
	0	.....	.....	.....	.....	.....	.....	.....	.....
Lutra canadensis (river otter)	1	.....	.....	.....	.....	.....	.....	3	.....
	0	.....	.....	.....	.....	.....	.....	2?	.....
Canis latrans (coyote)	.....	.....	9	2	.....	.....	.....	2	.....
	.....	.....	2	0	.....	.....	.....	0	.....
Felix rufus (bobcat)	.....	.....	3	.....	.....	.....	.....	.....	.....
	.....	.....	1	.....	.....	.....	.....	.....	.....
Marmota cf. flaviventris (yellow-bellied marmot)	22	.....	.....	.....	.....	.....	.....	.....	2
	7	.....	.....	.....	.....	.....	.....	.....	0
Citellus sp. (ground squirrel)	20	.....	.....	.....	.....	.....	.....	.....	.....
	10	.....	.....	.....	.....	.....	.....	.....	.....
Thomomys talpoides (northern pocket gopher)	4	.....	.....	.....	.....	.....	.....	5	.....
	3	.....	.....	.....	.....	.....	.....	3?	.....
Castor canadensis (beaver)	.....	.....	.....	.....	.....	.....	1	.....	.....
	.....	.....	.....	.....	.....	.....	0	.....	.....
Peromyscus maniculatus (deer mouse)	2	.....	.....	.....	.....	.....	.....	.....	.....
	2	.....	.....	.....	.....	.....	.....	.....	.....
Neotoma cinerea (bushy-tailed wood rat)	1	.....	.....	.....	.....	.....	.....	1	.....
	0	.....	.....	.....	.....	.....	.....	0	.....
Microtus sp. (meadow mouse)	5	.....	.....	.....	.....	.....	.....	.....	.....
	3	.....	.....	.....	.....	.....	.....	.....	.....
Ondatra zibethicus (muskrat)	66	.....	.....	.....	.....	.....	.....	.....	.....
	39	.....	.....	.....	.....	.....	.....	.....	.....
Lepus sp. (jack rabbit)	9	.....	.....	.....	.....	.....	1	1	.....
	3	.....	.....	.....	.....	.....	0	0	.....
Sylvilagus sp. (cottontail rabbit)	3	.....	.....	.....	.....	.....	.....	.....	.....
	2	.....	.....	.....	.....	.....	.....	.....	.....
Odocoileus cf. hemionus (mule deer, black-tailed deer)	68	12	80	80	922	7	142	101	6
	18	2	4	4	65	?	7	7	?
Bison bison (bison)	8	.....	3	.....	40	.....	1	1	1
	2	.....	?	.....	3	.....	?	?	?
Ovis canadensis (mountain sheep)	18	.....	2	5	.....	1	.....	.....	.....
	11	.....	?	4	.....	?	.....	.....	.....

* Mammalian material was identified by J. Arthur Freed, of the Department of Anthropology, University of California. State of Washington Initiative 171 funds for research in biology and medicine granted to Douglas Osborne have supported all analyses of biologic materials found in archaeologic context.

** NOTE: Top number designates total number of specimens; bottom number indicates approximate minimum number of individuals.

TABLE 16

	Projectile Points	Blades	Scrapers, Cutting Edges	Hammers	Pestles	Pipes	Choppers	Bowl Fragments
Chalcedony, Agate, Carnelian	28	10	13	....	....	....	....	....
Jasper, Jasp-agate, Jasp-opal	37	9	23	....	....	....	....	....
Opal, Opalized Wood	3	....	1	....	....	....	....	....
Petrified Wood	4	....	4	....	....	....	....	....
Opalite	3	....	....	....	....	....	....	....
Chert	6	....	2	....	....	....	....	....
Shales and Slates	3	1	1	....	....	1	....	....
Argillite	1	....	....	....	....	....	....	....
Micaceous Quartzite	2	2	7	....	....	....	11	....
Gneiss	....	....	....	....	1	....	....	....
Granite, Grano-diorite	....	....	....	2	....	....	4	....
Basalt	7	....	1	1	....	....	....	2
Rhyolite	....	....	....	....	....	....	6	....

followed the surface contour of the house pits in their deposition. This indicates that a large share of the artifacts found were deposited as part of the fill during short-term reuse of an old, filling pit or during the use of a nearby house pit. Series of artifacts that might be of value for study were too short to yield any evidence of change, using the above method of separation of artifact categories associated with a primary occupation of a house pit and those deposited during later use or use of neighboring pits. With a larger series it might be successful.

The fact that the same types of Indian artifacts were found with trade goods and without would seem to bear out Ray's (1932, p. 10) statements as to cultural isolation and a slow rate of change for the area. It also is probably true, though in a lesser degree, for other areas of the Plateau not penetrated by strong Plains influence.

Burials were found, but all had been disturbed, as has been mentioned. All that were found were near the river bank sites (OK2, OK1, etc.). The dead had been flexed, buried two or three feet deep, and the graves had been covered with small basalt boulders. The small cairns provided perfect markers for the graves, and it appears that collectors missed none.

Table 18 condenses the available information on the house pits of the reservoir. The measurements and greater east-west axis are both similar to the same traits farther south (McNary Reservoir).

The average diameter for all house pits measured in the Chief Joseph Reservoir was 22.9 feet for the north-south diameter and 24.8 feet for the east-west. The average depth was 1.9 feet. Of the 28 certainly measurable house pits, 17 had as the longest the east-west diameter. There was an average difference of 2.7 feet between the greater and lesser measurements; the range varied from 7.0 to 0.1 feet. Cultural significance is evident here. It has been noted before: archaeologically by Osborne (1951) and ethnographically by Ray (1942).

TABLE 17

SITE	Stemmed Points	Unstemmed Points
450K2	7	5
450K4	1	1
450K10	12	1
450K5	7	2
450K11	10	2
450K12	1	1
Total	38 (76%)	12 (24%)

TABLE 18

SITE	No. of Hse. Pits	Range N-S	Median N-S	Range E-W	Median E-W	Range Depth	Median Depth	REMARKS
450K1	....	.....	.....	.....	.....	.....	.....	
450K2	14	50'–7'	32.5	46.5–8	21.5	0.8–4.7	1.5	11 houses greater diameter E–W and parallel to river.
450K4	3	30?	?	43?	?	2.4–2.0	2.2	E–W greater diameter.
450K5	5	35?	?	40–60	50	2.5–3.7	3.2	E–W greater.
450K7	7	3.5–14.0	6.4	2.6–13.5	6.6	.8–2.5	1.3	Some house pit designations dubious. Greater E–W dia.
450K10	3	27.3?	?	26–30	28	1.5–2.0	1.75	See Figure 110.
450K11	8	14.5–33	21	20–35	26.5	1.3–1.5	1.4	E–W greater.
450K12	2	21.5	21.5	20.5	20.5	?	?	N–S greater.

SUMMATION

In some ways the data from the Chief Joseph Reservoir supplement that reported for the Upper Columbia-Grand Coulee Reservoir by Collier, Hudson, and Ford (1942). No house sites were excavated by the Upper Coulee crews. Middens and burial sites only were investigated there. In the lower reservoir no undisturbed burials were found. The middens in Chief Joseph were poor and, while extensively tested, offered nothing worthy of extended investigation.

It seems apparent that a single cultural level has been described herein. The inability of the survey crews to find earlier or different manifestations and the fact that nothing of this nature was found by men of the two excavating crews, while not proof that it is not there, certainly does not speak for extensive variance of occupation. The situation in Chief Joseph is, in a way, a reflection of that in other parts of the Columbia Valley. The large, fast river, which in most places lacks a wide flood plain for expansion, has, because of the confinement and nature of its sources, scoured and shifted the banks, bars, and islands rather more than do most rivers. The destruction of its archaeologic resources has been great.

Most ethnographic sources indicate that the winter homes of most of the people were in the Columbia and larger tributary valleys. Ross (1923, p. 340), however, states that "The Indians after passing a month or six weeks in this roving state [fall hunting in the mountains] congregate again into large bands for the purpose of passing the winter on the banks of small rivers, where wood is convenient and plentiful." One wonders if some such situation may not explain the poverty and lack of depth of the cultural indications studied in Chief Joseph Reservoir. Perhaps planned examinations of some of the tributaries and other areas back from the main river will throw light on this problem.

ADDENDUM

Further information on animal remains from the Chief Joseph Reservoir sites and from 45GR2, the Equalizing Reservoir cave site, arrived from the Smithsonian Institution only a short while before the galley proofs for the two reports herein presented. Mammal bones were identified by Theodore E. White, of River Basin Surveys, avian material by Herbert Friedmann, and fish by David H. Dunkle of the U. S. National Museum.

Apparently aquatic birds were often taken by the campers at GR2. The following were identified: *Podilymbus podiceps* (pied-billed Grebe), *Anas platyrhynchos* (Mallard duck), *Spatula clypeata* (?) (Shoveller duck), *Anas streperus* (Gadwall duck). Also present was *Xanthocephalus xanthocephalus* (Yellow-headed blackbird). These remains were found in all levels. *Clemmys* (turtle) was present in the top three levels of the cave site. As was expected, salmon bones formed the preponderance of fish remains. In all 22 lots of bones from the first six levels were salmon. Suckers (*Catastomidae*) comprised 7 lots from levels

1, 2, 3, 5. It does not seem likely that fish would have been cured or stored in a cave some 9 or 10 footpath miles from the river. All of the bones, therefore, must have been from provisions carried by hunting or gathering groups who camped in the cave and stalked or harvested in the flats and small swamps of the upper Coulee.

An addition to the Chief Joseph Reservoir picture of primary importance was the identification of the right lower jaw of an antelope (*Antilocapra*) from site OK5, House pit 1. As far as is known to me, this is the first conclusive evidence of that mammal in the eastern Washington area. Its presence has been suspected but proof appears to have been lacking. A few bones of the White-tailed Jack rabbit (*Sepus townsendii*) and of the turtle (*Clemmys*) were found.

Salmon bones were, quantitatively, more important than the other identified fish, the sucker. Seven lots of salmon remains from OK2, OK4, OK5, and OK12 were examined, five lots were from the first two feet of fill in various house pits. Two were from depths up to four feet. The sucker bones, three lots, were from two feet to four feet in depth. This differing depth distribution is considered, at the present, to be fortuitous.

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ARCHAEOLOGICAL INVESTIGATIONS IN O'SULLIVAN RESERVOIR, GRANT COUNTY, WASHINGTON

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DURING THE SUMMER field seasons of 1948 and 1950, excavations were conducted at several village sites located on the shores of Moses Lake, Washington, which lies within the reservoir area of the O'Sullivan Dam (Fig. 111). The 1948 field project was jointly sponsored by the Smithsonian Institution River Basin Surveys and the University of Washington. The excavation undertaken in 1950 was a cooperative project between the River Basin Surveys and the State College of Washington. Both projects were under the field direction of the writer.

Based on the results of an archaeological survey of O'Sullivan Reservoir by Francis A. Riddell and the writer in July of 1947, several sites were selected for further investigation. A large village site, designated 45GR27, received the full attention of the 1948 party, while a similar site, 45GR30, located approximately one mile north of the former, was partially excavated in 1950.

45GR27

Moses Lake lies within the Upper Sonoran life zone. Sage, weeds and grasses form the sparse ground cover. Along the lake a fringe of willow trees serves to interrupt the barrenness of the area. What is now Moses Lake was at one time the channel of the Columbia River when glacial ice dammed its regular course and forced the river southward. A series of old river terraces serve laterally to confine the present lake. Culturally, Moses Lake falls within the area assigned by Ray (1936) and Teit (1928) to the Columbia Indians.

Site 45GR27 is situated along a gently sloping beach immediately below the first terrace, on the north shore of the lake. The long axis of the site parallels the lake shore. Surface indications consisted of 33 circular or elongated depressions marking the location of former semi-subterranean earth lodges. The depressions occurred in groups varying in number from 2 to 11. This probably indicates the occupation of the site at different periods of time. Analysis of the cultural materials collected during the excavation appears to justify this conclusion.

From the 19 sites on the shores of the lake located by the survey, this site was chosen for excavation because of its large size, undisturbed nature, and accessibility.

One of the primary aims in the excavation of this site was to secure information on the important problem of the methods of construction and interior arrangement of the semi-subterranean house which appears to have been, at one time, the predominant type of winter dwelling in this region (Ray, 1939, p. 132). It was hoped that diagnostic traits of structural details might be obtained for comparative use with similar information from other areas.

The plan of excavation was, insofar as it was possible, to excavate completely each of the houses selected. During the ten weeks spent in the field two houses were completely cleared plus the north half of a third. In addition, a large area around a stone roasting oven was cleared. This structure will be designated as Feature 1 (Fig. 112).

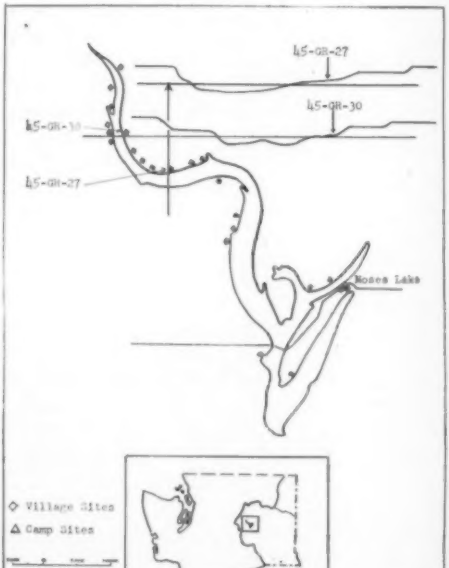

FIG. 111. Map of Moses Lake indicating site locations.

HOUSE PIT 1

One particularly well defined house pit (HP hereafter) was selected as the first to be excavated. Its appearance prior to excavation consisted of a circular depression with a slightly raised rim *ca.* 25 feet in diameter. The center of the depression was *ca.* 2 feet below the raised rim.

A north-south trench was started well outside the wall on the north side of the pit and extended through the house to a point *ca.* 8 feet beyond the south wall. It was hoped that this procedure would allow the identification of the house walls in the trench profiles, as well as to determine the placement of the roof poles. From the main N-S trench, E-W trenches were dug until the fill was completely removed, taking care to leave the floor deposit intact. The leaving of the floor was done to preserve structural evidence such as post-holes, fire areas, etc.

The level and extent of the floor was easily determined by noting where the relatively harder-packed floor deposit, intermixed with fragments of bone and charcoal, merged with a sand layer on all sides of the housepit.

Beginning at the surface, the soil profile indicated 2.8 feet of sandy loam, containing increasing amounts of small gravel towards the bottom of the layer, overlying a lens of clean coarse sand varying in thickness from .1-.5 of a foot. Underlying the lens of sand a deep layer of river cobbles was encountered. It was discovered that the house had originally been excavated down to the level of the coarse sand overlying the river cobbles.

Near the level of the floor the slope of the walls was easily observed, but, due to weathering action subsequent to the abandonment of the house, the upper portions of the walls were impossible to define. The slope of the walls had originally been approximately 70 degrees.

When completely excavated, the diameter of the house at floor level was 23.1 feet N-S by 21.7 feet E-W. The height of the walls varied with the uneven surface of the ground. Measurements taken at four points were: north side, 2.8 feet; east side, 1.8 feet; south side, 3.3 feet; west side 2.9 feet. The low wall on the east side was due to another house pit lying immediately adjacent, with more rapid erosion of the narrow intervening wall.

Our effort to locate the positions of the roof supports proved fruitless. It is quite possible that in this treeless region timbers suitable for roof supports would have been of considerable value and were removed when the house was abandoned. It would seem that a house of this diameter must have had some internal support for the roof.

Evidence was found pertaining to the internal arrangement of the house. Two grinding stones were found at floor level near the south wall. South of the center of the house an area of charcoal-darkened earth was discovered. It was also found that the greatest amount of refuse material, in the form of fragmentary animal bones, occurred in the south half of the house. It therefore seems evident that the household activities associated with the preparation of food were mainly confined to this area.

When the floor deposit was removed and carefully screened it was found that in addition to the fragmentary animal bones, it also contained quantities of flint chips, charcoal frag-

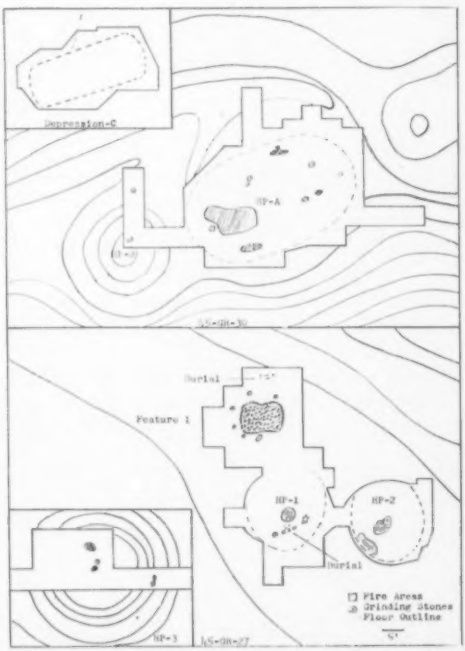

FIG. 112. Plan of excavated areas at sites 45GR27 and 45GR30.

ments, and several artifacts. It varied in thickness from .2 of a foot on the north side to .6 of a foot near the south wall of the house. Only one occupation layer was evident.

While removing the floor deposit a burial was uncovered lying near the south wall. The burial was made in a fully flexed position, lying on the left side with the head to the east. No artifacts were found with the burial. Only .2 of a foot of floor deposit covered the burial and this was not firmly packed as was the rest of the house floor, thus giving evidence that the house was not occupied after the burial was made.

A quantitative analysis of the refuse material collected from each .5 of a foot level indicated considerable amounts rather evenly distributed throughout the fill above the floor deposit. It appears evident that the quantities of refuse throughout the fill in HP-1 was caused by the abandonment of this house prior to the construction of the adjacent house, HP-2, and the subsequent use of this abandoned pit as a refuse dump for debris from HP-2. The conclusion as to different periods of occupancy of the two houses is further borne out by the fact that the narrow wall of sandy earth separating the two houses would never have remained standing had the houses been in simultaneous use.

House Pit 2

From surface indications prior to excavation, HP-2 appeared somewhat shallower and smaller in diameter than HP-1.

An E-W trench from HP-1 was dug through the intervening wall of earth and extended through the center of the house to the east wall. The same excavation procedure was followed here as used in HP-1. An important difference was noted in the character of the fill removed from HP-2. It was found to contain practically no refuse material, adding support to our previously stated conclusion as to the prior occupation and abandonment of HP-1.

When the house was completely cleared it measured 21.7 feet N-S, by 20.5 feet E-W at floor level. The depth averaged slightly less than that of HP-1 due to a slight rise in the underlying strata of sand and river cobbles. The slope of the walls here, as in HP-1, approximated 70 degrees. As was the case with HP-1 no evidence was obtained relating to the placement of the roof supports, probably for the same reason.

The interior arrangement was similar to that of the house previously excavated. The fire area was again on the south side, but this time paralleling the southwest wall. This charcoal-darkened area measured 5.5 feet by 2.5 feet and, as was the case in HP-1, was not defined by any sort of rock structure. Over 300 fragments of animal bones and several pieces of charcoal were removed from the fire blackened area. One bone awl was found in association.

A second charcoal-darkened area was found in the floor deposit just south of the center of the house. Again quantities of bone fragments were intermixed with the blackened earth. Adjacent to this fire area there was found a grinding stone of the same type as those from HP-1.

House Pit 3

HP-3, located approximately 100 yards west of HPs-1 and 2, was selected for excavation because it appeared to possess certain structural differences which would offer interesting comparative material. Surface indications showed it to be much larger than those previously excavated, nearly 35 feet in diameter. Also, the depth from surface was considerably greater, nearly 5 feet.

This house pit was the last to be investigated during the 1948 season and there was not sufficient time to allow its complete excavation. It was therefore decided to extend a 5 foot E-W trench through the center of the house and remove as much of the fill from the north half of the house as the remaining time would allow.

Structurally, this house differed from the two previously excavated in that it had a saucer-shaped floor. The floor at the center of the house was 1.6 feet lower than at the base of the walls. In other structural details there was general similarity. The walls had the same underlying layers of sand and river cobbles.

Owing to the fact that the house was only partially cleared, little was learned of the interior arrangement. Several small, charcoal-darkened areas were observed at floor level, but no large fire area was found. It probably lay under the unexcavated portion at the south side of the pit.

FEATURE 1

It will be recalled that the initial trench for the excavation of HP-1 was started well outside the house on the north side of the depression. In the first 5 foot square excavated, at a depth of 2.2 feet from the surface, a cluster of stones was encountered. While the trench into HP-1 was continued, other trenches were started to define the extent and nature of the cluster of rocks. Eventually an area 25 by 30 feet was excavated, before the full significance of this structure was ascertained. It proved to be a large stone roasting oven, measuring 9.7 feet along its E-W axis, by 7 feet at its widest point. Three feet from its west end there was a slight constriction at both sides, obviously due to the enlarging of the original structure.

The oven was composed of vesicular basalt rocks, averaging approximately 25 cm. in diameter. The rocks in the center had been placed flat, while a ring of rocks placed on edge formed a slightly higher rim. Situated at distances not exceeding 2.5 feet from the oven, at the south, west and north sides, were six grinding stones (Fig. 114, a). The oven and the ground around for a distance of several yards was heavily blackened with charcoal.

The firepit rested on a thin layer of soil .2 of a foot in thickness which was immediately above the layer of coarse gray sand that underlay the house pits. There was no depression at the surface of the ground to indicate that the stone oven had been constructed at the bottom of a pit. A study of the stratigraphy overlying the oven indicated that the soil had not been disturbed. The widely spread charcoal-blackened earth also lent support to the conclusion that no pit had been dug, but rather the oven had been constructed at a time when this level was the surface of the ground. The oven then, was not contemporaneous with the adjacent house pits for nearly three feet of soil had to accumulate before the house pits could have been dug.

North of the oven structure 7.5 feet and at a level nearly 1 foot above it, a very fragmentary burial was uncovered. Though in extremely poor condition, it could be determined that it was lying on its right side with the head to the west, in a fully flexed position. No artifacts were found with the burial. It was clearly more recent than the period of use of the oven.

45GR30

This site is located along the shore of the lake approximately one mile north of 45GR27. The beach at this point averages 75 yards in width. Situated at the base of the first terrace, the site extends along this narrow beach for one half mile. Surface conditions indicated 21 house pit depressions in scattered groups. The decision to excavate this particular site was based on its undisturbed condition, the occurrence of one particularly large and well defined house pit, and the relative accessibility of the site. The geography of the area is identical with that of 45GR27.

To avoid repetition, the discussion of the materials from this site will be made in terms of similarity or dissimilarity with the site previously discussed in some detail.

HOUSE PIT A

The largest and most clearly defined house pit was chosen as the first to be excavated. This house was situated immediately at the base of the first terrace. This location proved to be unfortunate as far as the work of excavating was concerned, for the fill was composed largely of sizable rocks that had become loosened and rolled down the slope into the pit. The fill was completely removed, leaving the floor intact, and all of the excavated earth was thoroughly screened. The definition of the floor surface was made possible by the occurrence of the many boulders that had come to rest there after rolling down the hill, and by its being more solidly packed than the fill. Several areas of charcoal-darkened earth found at the south end of the house, and several grinding stones, also aided in its location.

The shape of the house proved to be oval rather than circular. The long axis, paralleling the lake shore, measured 40.2 feet at floor level. The maximum width was 27 feet. The floor deposit, averaging .8 of a foot in thickness, and consisting of mixed earth and refuse, was resting upon the same layer of sand and cobbles that was encountered below the houses at 45GR27. The builders of the house had excavated the pit partially into the slope at the base of the terrace, resulting in a higher wall on the side facing the terrace. The wall on this side averaged *ca.* 5 feet in height, while on the side opposite, the average was 3.5 feet. The slope of the walls here, as at the other

site, approximated 70 degrees. The floor was flat as in house pits 1 and 2 of 45GR27. An interesting similarity was observed regarding the interior arrangement of the house. Here, also, we found that the greatest quantities of bone fragments and the charcoal-blackened areas occurred at the south end of the house, indicating, as in the other houses, that this was the portion of the house in which occurred the activities associated with food preparation.

Unfortunately, no evidence could be found suggesting the arrangement of the supporting members of the upper portion of the house, or suggesting its pattern of construction.

House Pit B

At both the north and south ends of HP-A, and immediately adjacent to it, were situated much smaller house depressions. After completing the excavation of HP-A it was decided to trench through the intervening wall and section the best defined of these, the one to the south. This was designated HP-B. The trench was continued to the center of the house, and then, at right angles to this, a trench was extended to the west wall. No attempt was made to remove the entire fill. The primary aim was to section this house rapidly to secure comparative data on the structural details and comparative specimens of material culture.

It was discovered that the original excavation had had a saucer-shaped floor like that found in HP-3 at 45GR27, the depth from surface being 5 feet at the center and 3.7 feet at the base of the walls. The floor deposit had accumulated more rapidly at the center so that ultimately the floor had assumed a nearly level appearance. The walls had the characteristic 70 degree slope. This house was roughly circular in shape and, had we completely excavated it, would probably have proved to be close to 30 feet in diameter. No additional details as to the method of construction were learned, nor did we find anything significant concerning the interior arrangement of the house.

Depression C

Some 80 yards to the south, along the lake shore, a very shallow, elongated depression was observed. Primarily due to its somewhat different appearance it was decided to clear the fill from this house site for additional comparative data. When excavated the pit measured 30 feet by 11.3 feet, the long axis paralleling the shore. The depth averaged only 1.5 feet. The evidence indicates that this was probably an excavation for a mat lodge rather than for a semi-subterranean dwelling. This was a common practice in certain parts of the Plateau. Teit, discussing the methods of constructing mat lodges found among the Coeur

	1	2	3	4	5	6	7	8	9	10	11	12
45-GR-27												
HP - 1		1				1			1			
HP - 2			1			1	1				1	
HP - 3						3	2		2	1	38	
F - 1	1	1	1	2		12	4	1	1		1	
45-GR-30												
HP - A		4	2		3	1				10	110	21
HP - B		1						1		1	2	
Pit- C										1	3	1

Fig. 113. Projectile point types with numerical distribution for sites 45GR27 and 45GR30.

d'Alene says, "These winter long houses were excavated to a depth of from 30 to 75 centimeters . . ." (Teit, 1930, p. 59). For the Northern Okanogan, Post and Commons report, "Here the house was built over an excavation about a foot and a half deep . . ." (Cline, et al., 1938, p. 38).

No evidence was found indicating the structural details, nor was information secured relating to the internal arrangement as no fire areas, grinding stones, or localized accumulation of refuse were found within the house depression.

Considerable similarity exists between the artifacts recovered from sites 45GR27 and 45GR30. For this reason they will be discussed here as a group. In spite of this general similarity, however, there are some typological and quantitative variations which imply slight temporal differences.

In order to facilitate the comparison of these artifacts with those collected by others in this region, the writer ventures to present a typology based, in several instances, on relatively few specimens.

The materials used in the manufacture of stone artifacts were chert, flint, chalcedony, jasper, agate, opalized silica, and basalt. While basalt was the primary material used for ground stone artifacts, only three chipped stone implements (projectile points; one type 1; two were fragmentary) of this material were found. One is impressed by the number of poorly made and asymetrical chipped stone artifacts from these two sites. This is especially true of site 45GR27.

In Figure 113 the typology and numerical distribution of projectile points has been illustrated. All of the projectile points recovered were produced by pressure flaking. A number of fragments of projectile points were found which could not be fitted into our classification, and since most of these fragments were from HP-A/45GR30 where a preponderance of type 11 points occurred, this would probably give an even higher percentage of this type point than indicated in Figure 113.

The most significant distributional factors concerning the projectile point types occurs with regard to types 6, 7, 10, 11 and 12 (Fig. 114, *b*). Types 6 and 7 are almost entirely confined to site 45GR27 and especially feature 1 of that site. With the exception of a single example of type 10 found in HP-3/45GR27, types 10 and 12 are restricted to 45GR30. Type 11, represented by the greatest number of examples, has its highest numerical representation in site 45GR30, but significantly, a large number were found in HP-3/45GR27. Although several other types have a rather exclusive distribution, the small number of representative specimens found does not permit any generalizations.

The numerous scrapers fell into several categories. Flake scrapers (Fig. 114, *f*, 9) include the numerous irregularly-shaped flakes of stone which show retouching along one or more of the edges. The retouched edges may be straight, convex, or concave. Frequently one specimen will have more than one edge retouched. It appears that no attempt was made to improve the gross shape of the flake, the retouched edge(s) being the only concern. The materials used in the manufacture of these scrapers is identical with that used for projectile points, with the exception of basalt. A large number of these flake scrapers was found in each of the units excavated at the two sites.

The oval scrapers (Fig. 114, *f*, 5), identified by shape, was made of quartzite, slate, basalt, or granite, the quartzite material being most commonly used. These scrapers are flat, oval-shaped pieces of stone that have been bifacially flaked on all edges. Examples of these scrapers were found in all units excavated at both sites.

Only two examples of snub-nosed scrapers (Fig. 114, *f*, 6) were found and both were recovered from HP-A/45GR30. The under-surface is flat while the upper surface is rounded with one abruptly tapering retouched edge. Both specimens of this type are small. The materials are the same as that of the flake scrapers.

Triangular scrapers (Fig. 114, *f*, *1*, *7*) can be differentiated from triangular projectile points by their usually larger size. Also, the base tapers to a sharpened edge while the thicker triangular point appears suitable for hafting. Strong, Schenck, and Steward (1930) have identified similar artifacts as points (pl. 12, *f-i*) while in the same report they illustrate hafted examples (pl. 17, *h*, *i*) and call them scrapers. Collier, Hudson and Ford (1942) illustrate examples of this type scraper and identify them as knives (pl. II, *p*, *s*). It is admittedly difficult to identify these artifacts in all cases.

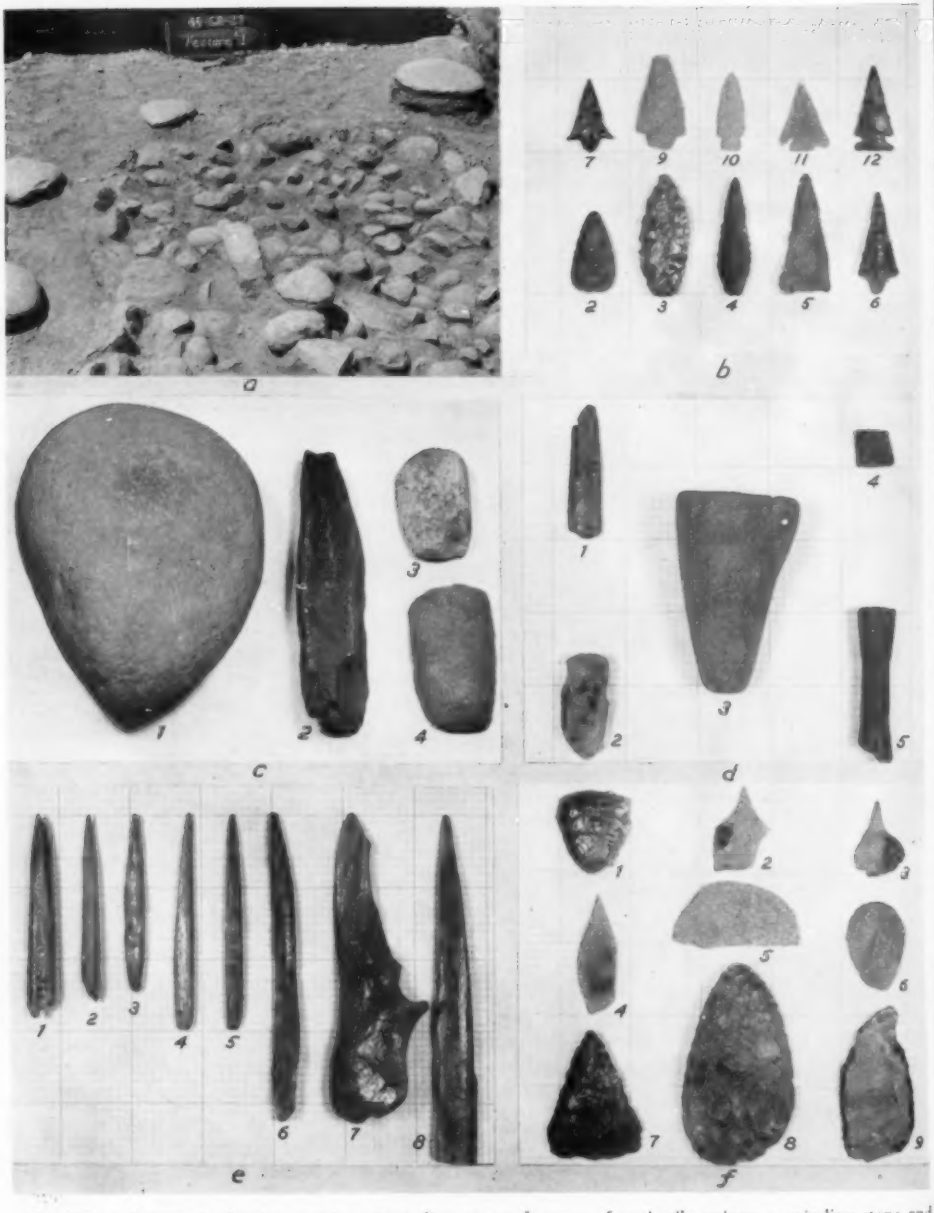

FIG. 114. *a*, Feature 1, showing position of grinding stones; *b*, types of projectile points; *c*, grinding stone and pestles; *d*, fragment of gaming piece, bone bead, stone pipes, and crystal pendant; *e*, bone points and awls; *f*, scrapers, knives, drills, and gravers.

The artifacts here identified as knives, though made of similar materials, are considerably larger than the projectile points. The knives are leaf-shaped with sharp cutting edges on all sides (Fig. 114, *f*, 8). Knives were found in the excavated areas at both sites, and from their reported distribution in other sites in the Plateau appear to have been in use over a wide area.

Two kinds of drills were found. Only one example of type 1 was found, and this at floor level in HP-1/45GR27. This drill is 57 mm. long by 9 mm. in diameter at the center, tapering to a point at each end. It is triangular in cross-section. Four specimens of type 2 (Fig. 114, *f*, 2, 3) were found in HP-A/45GR30. These drills differ from type 1 in that they have a broad, flat base which narrows to an elongated, tapering point. Examples of both types are illustrated for the Upper Columbia region (Collier, et al., 1942, pl. IV), and the Dalles-Deschutes area (Strong, et al., 1930, pl. 16, *e*, *h*).

A single type of graver was represented by examples from both sites excavated. One specimen was found in HP-1/45GR27, and four were found in HP-A/45GR30. It is a type commonly found along the Columbia River, an irregular flake with a small beak-shaped projection (Fig. 114, *f*, 4).

The chipped stone hammerstones are simple river cobbles with one end flattened through use. No attempt was made to alter the natural shape of the cobble. These are of varying sizes and weights, the largest weighing approximately 4 pounds. One of these hammerstones was found at floor level in HP-1/45GR27, while six were found in HP-A/45-GR-30.

One example of a line or net sinker of a type commonly found along the Columbia River was found in the floor deposit of HP-A/45GR30. This type of sinker is quickly fashioned by striking off flakes from four sides of a flat, oval-shaped pebble to form four shallow notches.

A pendant (Fig. 114, *d*, 2), formed by chipping a groove around the base of a quartz crystal, was found associated with feature 1/45GR27. It was found lying at the base of one of the grinding stones adjacent to the firepit. It is possible that this artifact may have been used for quite another purpose, as Teit (1930, p. 4), reporting on the Coeur d'Alene, states, "Stone of many kinds, intended for tools, was cut with quartz crystals."

The grinding stones found at sites 45GR27 and 45GR30 were of a single type. They were large river cobbles, averaging 37.5 cm. in diameter, with one flattened surface (Fig. 114, *c*, 1). A slight circular depression occurs near the center of the flattened surface and averages 12 cm. in diameter with a depth of 1 cm. Examples were found in house pits 1, 2, 3, and feature 1 of 45GR27, and in house pits A and B of 45GR30. (Compare Strong, Schenck, and Steward, 1930, p. 95; Collier, Hudson, and Ford, 1942, p. 75; Spinden, 1908: pl. VI) The large number of these grinding stones found implies that this was the principal type used in this area at that time. They were probably used with basket hoppers.

A single example of type 1 pestle (Fig. 114, *c*, 2) was found lying on a grinding stone adjacent to feature 1/45GR27. It was fashioned from an elongated bar of stone which had been rounded-off at the edges. From the chipped edges of the grinding surface it appears that a pounding as well as grinding action was used. An artifact similar in appearance and described as an "uncompleted pestle or hammerstone" is shown by Collier, Hudson, and Ford (1942, pl. XVII, *a*).

Pestles of a type 2 (Fig. 114, *c*, 3, 4) occurred in HP-3/45GR27, and HP-A/45GR30. Only fragments of the large ends were found, leaving the complete form unknown. Type 2 differs from type 1 in that this type has been ground to a nearly round cross-sectional appearance, with the largest diameter near the end having the grinding surface. This surface was ground to a smooth, slightly rounded shape.

A ¾ grooved hammerstone was found near the surface, in the earth overlying feature 1/45GR27. It was clearly not in direct association with either the feature or the house pits, although it is possible that it was lost during the occupancy of the house pits. This was the only hammerstone of this type found.

A distinct difference occurs between the type of pipe found at 45GR27, and that found at 45GR30. Of our type 1 (Fig. 114, *d*, 3) a complete specimen was found lying next to a grinding stone adjacent to feature 1/45GR27. A fragment of an identical pipe was found in the floor deposit of HP-1/45GR27. These pipes are conical shaped and the complete specimen has a perforated flange at the large end, probably for the attachment of a cord. The material is a fine-grained basalt. The hole was drilled from both ends leaving an irregular

inner surface and thick side-walls. The bowl is rimmed with a series of incised Vs for decorative effect. From the general shape, it seems that a mouthpiece, perhaps of bone or reed, must have been used.

Of type 2 (Fig. 114, *d*, 5) one nearly complete pipe and several fragments were found in the floor deposit of HP-A/45GR30. The material appears to be a fine-grained micaceous sandstone. Pipes of this same material but of different shape are reported for the Dalles-Deschutes region (Strong, et al., 1930, p. 104). In form the pipe is a hollow tube, flaring at both ends. One of the fragments recovered indicates a similar pipe with more flare to the bowl.

Two small basalt river cobbles, with sides flattened due to a rubbing action, were found in association with feature 1/45GR27. No attempt had been made to alter the gross shape of the cobbles, although it is apparent that the stones had been selected as abraders for their naturally flattened sides.

A small angular piece of basalt, probably an awl sharpener, with a narrow groove worn in one side was found in HP-B/45GR30. Eleven small pieces of red ocher (hematite) were found in HP-A/45GR30. A single piece was found at site 45GR27, in HP-1.

Straight bone awls (Fig. 114, *e*, 6, 8) were found in house pits 1, 2, and 3, of 45GR27 and in HP-A/45GR30. These awls are usually flattened in cross-section with one end tapering to a point. The end opposite the point frequently remains unfinished, although on several specimens it has been squared off. Only two ulna awls (Fig. 114, *e*, 7) were found, and both of these in HP-A/45GR30. Both have rather short, blunt points.

A number of bone artifacts have been descriptively termed points since their use is unknown (Fig. 114, *e*, 1-5). All examples are less than 8 cm. long, and in cross-section are oval or nearly round. One end is ground to a long, tapering, sharp point. The opposite end has been ground to a blunt point, perhaps to facilitate its being fitted into a socket. They may have been used as awls or as part of some sort of compound fishing device. A similar artifact has been identified by Strong, Schenck, and Steward (1930, pl. 8, *f*) as a "lance or harpoon point." One of these points was found in HP-2/45GR27, and six were recovered from HP-A/45GR30.

A piece of worked bone 52 mm. long by 11 mm. in diameter, with one end necked-down to a slightly smaller diameter, was removed from the floor deposit of HP-2/45GR27. Numerous fine cuts covering the surface of the necked-down portion suggest that this was probably a flaking tool. The tip appears to have been broken off.

A fragment of incised bone (Fig. 114, *d*, 1) was one of the artifacts found in association with feature 1/45GR27. The pattern of the incised design was a series of adjoining Vs, a design similar to that occurring around the wide end of the stone pipe found nearby. A set of gaming pieces with almost the same shape and same design, and identified as being from eastern Washington, is in the collections of the Washington State Museum at the University of Washington.

One-half of a bone bead was found in HP-A/45GR30 (Fig. 114, *d*, 4). This bead fragment had five parallel incised lines apparently running completely around it. It was the only bead found in the excavation of the two sites.

Two tiny bone points, about the size and shape of teeth on a modern pocket comb, were found in HP-A/45GR30. The use of these small points is not known.

Only two burials were found during the two summers' work at sites 45GR27 and 45GR30. Their location and orientation has already been described. Both were in a very fragmentary state due to the poor conditions for preservation and the activities of rodents.

At site 45GR30, located along the edge of the first terrace above the site, the remains of a series of cairn burials were observed. The graves had been systematically rifled by local collectors. Little could be learned other than that these burials were cremation burials. No such burials were discovered along the crest of the terrace behind 45GR27.

Certain summarizing conclusions can be drawn from these archaeological investigations at two village sites located on Moses Lake, within the O'Sullivan Reservoir area, Washington. In all, four house depressions were completely excavated, two others sectioned, and a large, stone roasting oven exposed. A number of artifacts were recovered and some information was gained as to the methods of construction, as well as on the interior arrangement, of the semi-subterranean type house found in this area.

Concerning the structural details, it was discovered that three different plans had been followed in the excavation of the house pits. Type 1, a circular pit with a flat floor, is represented by house pits 1 and 2 of 45GR27. Type 2 is also a circular pit, but with sloping floors. HP-3 of 45GR27 and HP-B of 45GR30 are of this type. HP-A of 45GR30, representing the third type has a large, oval-shaped pit with a flat floor.

In all of the houses excavated it was found that the wall slope approximated 70 degrees. This characteristic may have been dictated by the loose, sandy nature of the soil, or it may prove to be a trait of wider distribution.

Since each of the house pits had been excavated to an underlying stratum of sand and river cobbles, the depth of the house pit depended upon the depth of the overlying deposits.

The interior arrangement of the semi-subterranean dwellings which were completely excavated was essentially the same for the two sites. The greatest accumulation of refuse material, along with charcoal-darkened areas and grinding stones, commonly occurred south of the center of the houses. Several grinding stones were found, however, in the north half of HP-3/45GR27, and one in the north side of HP-A/45GR30.

Unfortunately, no evidence was obtained as to the form of the roof, placement of the roof supports, or the situation of the entrance, in any of the houses excavated.

Little information was gained in the excavation of Depression C of site 45GR30. No structural details were determined, and few artifacts were found. Though this depression was probably that of a mat lodge, the artifacts recovered here exhibit no significant differences from those obtained in the excavation of the semi-subterranean houses.

With regard to the temporal sequence at 45GR27, it was found that feature 1 was constructed first, followed by an accumulation of a three foot covering of earth. Then HP-1 and later HP-2 were constructed. The temporal relationship of HP-3 to the other units excavated at this site is not clear although some difference is suggested. At site 45GR30 the temporal relationship is not clear.

Since not a single item suggesting white contact was found in the rather extensive excavations at the two sites, it is almost certain that the sites are pre-white. However, the similarity of the artifacts found here to those found at other sites in the region in association with contact material, suggests the occupancy of these sites not long before the earliest white contacts.

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The following abbreviations are used:

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AAn	*American Antiquity*. Menasha.
BAE-AR	*Bureau of American Ethnology, Annual Report*. Washington.
BAE-B	*Bureau of American Ethnology, Bulletin*. Washington.
EG	*Early Georgia*. University of Georgia Press.
SMC	*Smithsonian Miscellaneous Collections*. Washington.
SMP	*Southwest Museum Papers*. Los Angeles.
TAPS-B	*Texas Archaeological and Paleontological Society, Bulletin*. Lubbock.
TR	*The Record*. Dallas.
UC-AR	*University of California Anthropological Records*. Berkeley.
UC-PAAE	*University of California Publications in American Archaeology and Ethnology*. Berkeley.
UW-PA	*University of Washington Publications in Anthropology*. Seattle.

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1951 VIKING FUND MEDALS AND AWARDS

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TENTATIVE PROGRAM

(*Condensed*)

17TH ANNUAL MEETING

OF THE

SOCIETY FOR AMERICAN ARCHAEOLOGY

Columbus, Ohio

May 1 to 4, 1952

THURSDAY, MAY 1ST

MORNING:

Registration at Ohio State Museum.

AFTERNOON:

First General Session, 2:00 to 4:00 p.m.; chairman, H. C. Shetrone

FRIDAY, MAY 2ND

MORNING:

Roundtable on paleo-Indian and Archaic of the Eastern and Arctic regions of North America. Chairman, John Witthoft.

Presentation of ten prepared papers. Discussants, Irving Rouse and John Cotter. 9:00 to 12:30.

AFTERNOON:

Roundtable on archaeology of the Ohio Valley and its relation to adjacent regions. Chairman, William J. Mayer-Oakes.

Presentation of eight prepared papers. Discussants, William A. Ritchie, J. Joe Bauxar, Richard G. Morgan. 1:30 to 5:00.

EVENING:

Annual Dinner of the Society for American Archaeology, held jointly with the Central States Anthropological Society.

Address by Jesse D. Jennings, "Danger Cave, Utah: a Preliminary Statement" (illustrated).

SATURDAY, MAY 3RD

MORNING:

Roundtable on Radiocarbon Dating. Chairman, James B. Griffin.

Reports will be made on the current status of laboratories and research at five institutions; a panel will discuss radiocarbon dates and archaeological interpretations in various American areas from South America to the Arctic. 9:00 to 12:30.

AFTERNOON:

Second General Session, 2:00 to 4:00. Chairman, Richard B. Woodbury.

Annual Business Meeting of the Society for American Archaeology, 4:00.

SUNDAY, MAY 4TH

Tour of archaeological sites in the vicinity of Columbus (those interested may make arrangements with Mr. Baby of the Ohio State Museum, during the meetings).

GENERAL INFORMATION

Hotels: Special arrangements for reservations for all those attending the meetings have been made by the Deshler-Wallick Hotel, Columbus.

Papers: All prepared papers will be held strictly to *15 minutes* in length, in order to permit time for discussions.

INVENTORY OF BACK NUMBERS

AMERICAN ANTIQUITY

(as of February 29, 1952)

Vol.	*No.*	*Copies*	*Vol.*	*No.*	*Copies*
1	1	202	10	1	102
	2	176		2	98
	3	200		3	105
	4	232		Memoir II	55
2	1	105		4	103
	2	107	11	1	10
	3	137		2	38
	4	131		3	36
3	1	40		4	71
	2	40	12	1	45
	3	33		2	—
	4	48		3	—
4	1	—		Memoir III	—
	2	—		4	50
	3	22	13	1	—
	4	27		2	145
5	all out of print			3	311
6	1	490		4	278
	2	31		Memoir IV	379
	3	—	14	1	221
	4	—		2	246
7	1	39		3	309
	2	54		4	310
	Memoir I	74		Memoir V	451
	3	103	15	1	282
	4	91		2	259
8	1	65		3	292
	2	69		4	353
	3	118		Memoir VI-VII	343
	4	122	16	1	200
9	1	65		2	240
	2	87		3	330
	3	136		4	308
	4	151	17	1	208
				Memoir VIII	366
				2	205
				3	215

The above list speaks for itself. If any members plan to fill out their series, the time to act is now.

The inventory will be published again next April.

NOTES AND NEWS

ARCTIC

The first Dorset house to be discovered in the region was excavated by Deric O'Bryan at the Mill Island site in northern Hudson Bay during the past season; the site appears to be a pure Dorset culture site. Its description should go far towards clarifying the pre-Thule occupation of the eastern Eskimo area.

W. E. Taylor also secured Dorset material, including a complete soapstone lamp, from the Cornwallis Island site (Northwest Territories) where he and Henry B. Collins worked in 1950. Taylor completed work on this site in 1951. The results of the two seasons will be included in Collins' full report to the Canadian National Museum.

The region of the lower Mackenzie River yielded information on a rather large number of sites to R. S. McNeish on his 1951 reconnaissance. Twelve sites, between Great Bear Lake and Fort McPherson, yielded about eighty flints. One of these consisted of a culture stratum buried two feet deep on a high terrace on the west shore of Great Bear Lake. Along with a few fossil bones and a piece of mammoth tusk, McNeish found large, narrow, concave-based points, scrapers, a chopper, a leaf-shaped blade, and a snub-nosed scraper. A field trip planned for the coming season is focused on this important find. A large number of sites were located by hearsay, indicating a broader field of operations than was formerly suspected for this inland zone.

James W. Van Stone excavated a 15th-16th century area at Kotzebue including nine house pits, for the University of Alaska. Wendell Oswalt, of the same institution, surveyed the Copper River region of southern Alaska, with special emphasis on extending the treering calendar south of the Alaska range.

The University of Michigan has sponsored for the past four years a continuous program of anthropological and botanical field work in the Aleutians. Beginning in 1948, the project, directed by Theodore P. Bank, Jr., has been co-sponsored by the Office of Naval Research and the Michigan Memorial Phoenix Project. Associated have been A. C. Spaulding, J. F. Bank, W. R. Hurt, H. A. Miller, D. S. McClain and L. H. Jordal. By this group field investigations were undertaken on more than twenty Aleutian islands and in five Aleut villages. Major archaeological excavations were completed at Agattu and Unalaska, and in addition most of the known Aleut burial caves were revisited for excavation of levels below those previously sampled by Dall, Jochelson and Hrdlicka.

From this work a number of interesting correlations between anthropological and botanical data have resulted. Phytoecological studies of prehistoric village sites indicate a close correlation between former Aleut plant uses and present day vegetation and a possible correlation between the latter and age since abandonment of such sites. Ethnobotanical studies have shown the old Aleut plant lore to be more extensive and important to Aleut culture than has previously been supposed. At Unalaska, two deep sites separated by only a few miles of water produced artifacts which appear to be representative of different ages.

Aside from botanical and archaeological studies, the expeditions completed ethnological studies in the present day villages. Medical and economic data are available for a close analysis of the trends of Aleut acculturation. Plant, animal and place names fully annotated with actual Aleut names provide a basis for linguistic comparisons among the various Aleut dialects and between Aleut and Eskimo.

Materials from the 1951 expedition are being studied at the University of Michigan and by specialists at other institutions. Ethnobotanical samples are being dated by the University of Michigan radiocarbon laboratory.

SOUTH AMERICA

PERU. In the summer of 1951 a UNESCO mission headed by George Kubler visited Cuzco to make recommendations for the reconstruction of historical and archaeological monuments destroyed in the 1950 earthquake (see this journal, vol. 16, no. 4, pp. 367-368). Kubler has kindly furnished the following résumé of the work of this mission.

"The earthquake of May 21, 1950 at Cusco not only ruined the city: it produced in Peru a profound division of opinion regarding reconstruction. The damages seemed irreparable at first. Of 4000 dwelling units, only 1200 remained after the shock. 20,000 people abandoned the city: of the 60,000 remaining, over a quarter were homeless. The material damage alone amounted to 500,000,000 soles. In Peru, opinion promptly divided into three factions. One clamored for a rebuilding of the pre-Hispanic, fifteenth century capital of the Incas, at the expense of the colonial city. A second faction urged the faithful restoration of the colonial monuments alone. A third party advocated the building of a new and modern city of wide streets without regard for historic and archaeological monuments.

"Faced with these apparently irreconcilable differences of opinion, the Government of Peru requested from UNESCO a mission of technical expert-advisers to study the reconstruction, restoration, and urban reform of Cusco. The mission was appointed in June 1951. It undertook at once a three-month's study of the problem in Peru, with two months on the ground in Cusco. Dr. George Kubler, of the Department of the History of Art at Yale University, served as head of the mission. Luis MacGregor Cevallos, of Mexico City, was appointed as architect-restorer. Oscar Ladron de Guevara A., of Cusco, served as architect-archaeologist.

"In Lima and Cusco the mission consulted with town-planners, with archaeologists, and with the authorities responsible for the conservation of colonial monuments. In respect to town-planning, a zone of colonial and archaeological monuments was defined after close study in Cusco. This zone will be the object of special statutes

protecting all monuments. The mission has also recommended that all but three of the churches of Cusco be restored. All Inca walls and buildings are automatically to be regarded as 'untouchable.' As restoration progresses on colonial monuments, the archaeological study of the underlying Inca ruins can be pursued.

"The mission proposes that Cusco be restored in two levels: that the underlying Inca ruins be explored and made accessible by subterranean passages, while the overlying colonial buildings are restored to their former aspect. In this fashion, both Inca and colonial Cusco can be preserved. Beyond the archaeological and historical zone, new construction will be restricted only by the recommendations of the town-planning commission appointed in Peru. All authorities in Peru—governmental, ecclesiastical, and professional—have agreed with these proposals.

"The findings of the mission will be published by UNESCO in 1952, in the form of a detailed and illustrated report. The report will include descriptions of the damages; measured drawings; archaeological and town-planning proposals; historical discussions of the monuments; and reconstruction schemes."

In assessing the damage at the church of Santa Domingo, the site of the Inca Temple of the Sun, the mission undertook some excavations around the foundations of the apse. In the course of this work, four colonial burial vaults were discovered, two in the chancel and two in the aisles. The two in the chancel each contained a disturbed heap of several hundred burials dumped there after being cleared out of somewhere else, probably the floor of the nave. According to a document found in Cuzco by J. H. Rowe, one of these vaults in the chancel was the burial place of the last independent Inca emperor, Tupa Amaru, put to death by the Spaniards in 1572.

In Berkeley, explorations in the Uhle collections from the Peruvian coast continue to yield valuable new information. J. H. Rowe reports the identification of a grave lot, including a mummy, of the Paracas Cavernas style. The grave was found at Ocucaje, Ica valley, in Uhle's 1901 season. The identification rests on a negative painted bowl of Cavernas style, the only piece of pottery in the lot. The body (a young woman) was wrapped in one or two cloths which had apparently fallen away at the time of excavation and which were wadded up by the excavator for packing with the body. One of the cloths has a decorative border. Bolls of raw cotton and pieces of root, probably manioc, accompanied the burial. This lot is important because no complete grave from this period, the earliest one known on the south coast, has ever been described, and there are probably no others in the United States.

Systematic revision of the Uhle collections, begun in 1950 and now being carried on by Dwight T. Wallace, has brought to light a number of mistakes in the interpretation of Uhle's catalog which may affect details of the accepted pottery chronology of the area, set up by Kroeber, Strong and Gayton in their classic reports of 1924-27. Not all the lots which they treated as grave lots were so reported by Uhle, and his catalog lists some additional grave lots which have not previously been noticed.

Wallace and Carleton I. Calkin have continued work on the collection from Cemetery F at Moche, extending the sequence of Moche (Early Chimu) subperiods, reported last year, to non-stirrup spout vessels and working out the details of the sequence in painted designs and modelling. An interesting test of the sequence was provided by Richard P. Schaedel's publication of the spectacular Moche style wall paintings which he discovered at Pañamarca in Nepeña valley (see *Archaeology*, vol. 4, no. 3, 1951, pp. 145-154). The painting on the cover is Moche III, according to the criteria worked out by Calkin on the pottery, while the long frieze is Moche IV.

Gordon Grosscup has made a revision of the middle Ica and late Ica sequence on the basis of the Uhle grave lots. He concludes that middle Ica II and late Ica I are the groups of chronological importance; middle Ica I and late Ica II are minor variants and should not be treated as separate periods on the basis of evidence so far available. Late Ica I materials are associated with Inca style pieces and with Colonial trade beads.

Richard V. Wagner has used the grave lots to sort Uhle's Nieveria collection. The grave lot material breaks clearly into two styles: one a variety of the so-called "Interlocking" style and the other a local Tiahuancaco influenced style (d'Hartcourt's Cajamarquilla). Most of the unassociated pieces in the collection can be assigned to these two groups. The "Interlocking" is related to Chancay Interlocking but is far from identical with it, and relatively few of the pieces have designs which actually interlock.

SOUTHEAST

Florida. The Florida Park Service and the Florida Geological Survey cooperated in a salvage excavation at the Bluffton shell heap on the St. Johns River, which was being removed for road material. Surface collections indicated a long occupancy for the site, but the portion excavated contained only levels from pre-pottery and fiber-tempered pottery times. A depth of 17 feet was tested. Most interesting result was the discovery of a period characterized by plain fiber-tembered pottery, in contrast to the decorated pottery of the Orange Period. The exact placement of this period remains to be worked out in the laboratory.

During the fall semester the University of Florida field program has been more limited than usual, but excavations were reopened at Spaldings Lower Store concentrating on a search for structural remains. A brick chimney base has been found to date.

The fourth annual between-semester joint excavation of the University of Florida and Everglades National Park was carried out this year in the Cape Sable area. The shallow but widespread Lundsford site was extensively tested yielding typical Indian pottery of the Historic Glades IIIc period, along with Spanish olive jar

sherds and a single glass bead. Two other sites (Mo 37A and Mo 38) in the vicinity were also tested; they are prehistoric but difficult to place.

ARKANSAS. Lynn Howard plans to incorporate the results of the University of Arkansas Summer Field dig with information from the Battle Site near Louisville, Arkansas, with hopes of using it as a doctoral dissertation at Michigan. Doctor C. H. Webb and Howard visited an Archaic site near Calion, Arkansas this summed, carrying out little testing, and finding that the site is definitely of the Poverty Point type. No clay balls were present, but one interesting cache of six ground stone celts was found. Webb examined the material at the time and pronounced it very much like the material he found at Poverty Point. The six stone celts he considered quite similar to a stone celt that Phillips and Ford found at Belzonie. Howard is working on a short paper about this site. The other material found in the survey along the Ouachita is a little difficult to explain briefly, but adds to the development of the Fulton aspect in south Arkansas.

LOUISIANA. Wm. G. McIntire, a graduate student in the School of Geology of Louisiana State University spent the past summer making surface collections in coastal sites, covering the area from the Chandeleur Islands to the Sabine River. He is now classifying the materials in preparation of a report.

SOUTH CAROLINA. Joseph Caldwell is at present excavating the site of Fort Charlotte, built in 1765 as one of the Colonial defenses against the Cherokee Indians and seized on July 12, 1775 by South Carolina troops. The latter was one of the first overt acts of defiance by the rebellious colonies against the British government. The fort continued to be occupied by Colonial troops until the close of the Revolutionary War. While the investigations pertain more to historical than aboriginal archaeology, some interesting material is being found. Caldwell reports the presence of large numbers of potsherds similar to those present at the Rembert Mounds on the Savannah River in Georgia. What correlation there may be between them and the fort remains to be seen. It is, of course, possible that the fort was built on a former Indian site. Caldwell reports that there is a large site of the Old Quartz culture not far distant from the remains of Fort Charlotte and before he has completed his investigations at the fort he probably will do some testing at the other locality. Surface material there is quite similar to that which he dug from the deep level at the Lake Spring site.

GEORGIA. Joseph R. Caldwell completed his investigations for the River Basins Surveys at the Lake Spring site in the Clark Hill Reservoir north of Augusta, Ga., in November. All work was not completed but the rising waters of the reservoir forced him out of the area. Carl Miller originally discovered the site while he and Caldwell were making a survey of the Clark Hill Reservoir basin and Miller had an article about it in *American Antiquity*, Vol. 15, No. 1, July 1949. In the course of his additional work there Caldwell found a prepottery level containing numerous large stemmed-projectile points and many objects of bone. He also found some evidence for semi-permanent shelters. What was of greater significance, however, was the discovery of a lithic culture in a stratum 4 feet below the base of the prepottery Stallings culture zone. The artifacts from the deep horizon were entirely made from quartz and are quite distinct from those of the upper levels. Numerous sites containing artifacts of that type have been noted in the upper Chattahoochee drainage near Buford, Ga., and also in the Cartersville and Athens areas, and while they appeared to be old, there was no evidence to indicate their proper position in the sequence until the deep level was discovered at the Lake Spring site.

The excavation by the National Park Service of two 18th Century houses at Fort Frederica National Monument has been completed and the artifacts brought to Ocmulgee National Monument for study and cleaning. The two houses consisted of brick and tabby foundations with a party wall for both houses. The buildings were begun in 1736 with later additions and represent a good sample of the construction and artifacts of the period. Six wells were found, four of them excavated to bottom. These had been filled with considerable household trash as well as accidental inclusions. The artifacts consist of English salt-glaze and lead glaze stone wares, English Delft, soft-paste porcelain, glass bottles and Chinese export porcelain. A number of whole or restorable pieces in each category will help illustrate these wares. A large quantity of English clay pipes, some with makers marks, was also obtained. Iron objects include bayonets as well as hinges, nails, and shutter catches. The wells contained wooden barrel staves below water-line, squash or watermelon seeds and peach pits. A temporary exhibit is being prepared for Fort Frederica.

PACIFIC

Charles E. Borden, University of British Columbia, plans extensive excavations this summer in the Tweedsmuir Park area of British Columbia. This work, sponsored by the British Columbia Ministry of Education, will permit the recovery of archaeological data prior to the flooding of the lakes there as part of the Aluminum Company of Canada development.

The University of California Archaeological Survey is carrying on several long-range projects. Excavation of the 16th century sites at Drake's Bay continues under the supervision of Robert J. Squier. A. E. Treganza, San Francisco State College, collaborated with the UCAS in recording about 200 new sites in Stanislaus and Calaveras counties. Martin A. Baumhoff, Assistant Archaeologist of the Survey, has been conducting survey work and the recording of private collections in Tuolomne County.

William J. Wallace, University of Southern California, has been directing students in the excavation of two shell mounds near the Los Angeles-Ventury County

line and plans further excavation during the Spring semester. He has also located several rock shelters in the same area, one with a series of rubbed petroglyphs.

At the Department of Anthropology, University of Utah, current research projects are continuing. Jack Rudy, Field Director of the State-Wide Archaeological Survey, is now completing the writing of a report which brings together all the sporadic survey material of the past fifteen years as well as the past season's work in western Utah. Sue Price, Museum Assistant, is analysing and preparing for publication a paper which describes a small house site that evidently can be equated with the Gosiutes of western Utah. Jesse D. Jennings has begun analysing and describing the cultural material from Danger Cave, Wendover, Utah, where the department for the past three years has conducted its summer field school. Plans are also being formulated for this coming summer to move the field school to Garrison, Utah, where one of several caves and one of two pottery bearing sites are to be tested.

PLAINS

Under the direction of Paul Cooper the Missouri River Basin Survey of the Smithsonian Institution has completed, or has now in progress, several major research reports in addition to those appearing as articles in this issue. A report by Donald J. Lehmer on his excavations at the Dodd and Phillips Ranch sites in the vicinity of the Oahe Dam, South Dakota, is virtually complete. A report on a burial site in the Harlan County Reservoir, Nebraska, by Marvin F. Kivett, a former staff member, is now in press. Reports on the following subjects are now in progress by staff members and former staff members: Rock Village, Garrison Reservoir, North Dakota, by Donald D. Hartle; Oldham site, Fort Randall Reservoir, South Dakota, by Robert B. Cumming, Jr.; Angostura Reservoir, South Dakota, by Richard P. Wheeler; Keyhole Reservoir, Wyoming, by Richard P. Wheeler; Fort Stevenson, Garrison Reservoir, North Dakota, by G. Hubert Smith; Medicine Creek Reservoir, Nebraska, by Marvin F. Kivett; Lower Cheyenne Village, Oahe Reservoir, South Dakota, by Waldo R. Wedel; Fort Lookout, Fort Randall Reservoir, by Carl F. Miller.

Present plans of the Missouri River Basin Survey for the 1952 field season are for excavations in the Garrison, Oahe, and Fort Randall reservoirs on the Missouri River in North and South Dakota, in the Jamestown Reservoir on the James River, North Dakota, and in the Bixby Reservoir on the Moreau River in South Dakota. Investigations of historic sites in the Garrison and Fort Randall reservoirs will continue and a reconnaissance party will investigate the archaeological potentialities of a large number of reservoirs scattered over the Missouri Basin.

At this writing the National Park Service is in the process of negotiating cooperative agreements with various state universities for additional work in reservoir areas throughout the Great Plains.

James Howard reports that plans of the State Historical Society of North Dakota for the 1952 season have not been formulated as yet. He adds that the date bracket for the Old Fort Berthold site, or Like-a-Fishhook Village, at which he excavated in 1951 is 1845 to 1890, and not 1867 to 1890 as reported for Notes and News, in AMERICAN ANTIQUITY, Vol. 17, No. 2, p. 179. Howard is preparing a report for that National Park Service on last season's work and will publish a shorter paper in the *North Dakota Historical Quarterly*.

Wesley R. Hurt of the W. H. Over Museum, University of South Dakota, finds that the pottery from the lower levels of the Scalp Creek site, Fort Randall Reservoir, has certain resemblances to that found at Loseke Creek, Valley I, and Eagle Creek in Nebraska. The only pottery with close affinities to that from the upper level is from the La Roche site in South Dakota. Plans for the 1952 season are not definite at present but he hopes to excavate a site in the Oahe Reservoir. His report on the Scalp Creek site is still in progress.

Carlyle S. Smith of the Museum of Natural History, University of Kansas, is working on a report of the second season at the Talking Crow site, Fort Randall Reservoir. Considerable data have been added to those gathered at the site in 1950. Plans call for a third season at the site in which he hopes to carry on extensive excavations in areas not marked by house depressions in order to find secondary structures and features to supplement data from the houses. William O. Leuty, Alfred Johnson, and Randall Weeks of Ellsworth, Kansas, recovered a large number of Late Glaze Pueblo sherds from the Spriggs Rocks site in Rice County, Kansas, and donated them to the museum along with surface collections from other sites in the vicinity. Mary Lou Kiehl is engaged in the analysis of the material from the Mugler site, a component of the Upper Republican aspect in Clay County, Kansas.

Marvin F. Kivett of the Nebraska State Historical Society Museum announces the first of a new series, *Publications in Anthropology*, which will be initiated this year with a paper by him concerned with Woodland sites excavated by the Society in Nebraska in 1940, 1949, and 1950. The 1950 field work was financed in part by the National Park Service. A report on the work carried on at early contact earth lodge villages in Fort Randall Reservoir in 1951 is in progress. Kivett plans to return to the same area in 1952 to supplement the data from last season and to excavate a site attributable to the Woodland Pattern.

William Mulloy of the University of Wyoming is engaged in the excavation of a site near Laramie which has produced projectile points resembling those from Browns Valley. The site covers about a half acre under the shelter of a bluff. Bison bones and stone tools occur under six inches of overburden. During the summer he

plans to return to the Keyhole Dam in northeastern Wyoming where he will camp 17 miles northeast of Moorcroft and finish the excavation of a large stratified site with Signal Butte I and II affiliations.

Robert E. Bell of the University of Oklahoma reports that Karl Schmitt and Raymond Toldan have an analysis of materials from two of the Washita River sites ready for publication. Charles Bareis is analyzing the Brackett site of eastern Oklahoma, a component of the Gibson aspect, which produces Spiro-like material. Mrs. Gertrude Phillips is studying the data from the Williams site, a component of the Fourche Maline focus in eastern Oklahoma. Charles Proctor is preparing the final report on last summer's excavations in the Eufala Reservoir. Bell and Richard Frazer have completed a preliminary report on the excavations carried on at the Morris site last season.

A new site near Rosedale on the Canadian River has yielded pottery which appears to be typically Woodland in character. The vessels have cord-marked surfaces and pointed bases. Only preliminary work has been accomplished, but the site seems to represent a heretofore unrecognized horizon in central Oklahoma, definitely different from the Washita River focus.

Bell plans to hold the summer field school at the Morris site in Tenkiller Reservoir. Some 15 burials were removed from the site last season. He plans to conduct excavations within the burial area and hopes to find houses as well. The site appears to date from Fulton aspect times although some earlier materials are represented. He feels that the site should give information which will be of assistance in understanding the newly recognized Turkey Bluff focus. A survey of either the Keystone or Oolgalah reservoirs in eastern Oklahoma will be made in cooperation with the National Park Service.

Plans for Caddoan workshop conference sometime this spring are being formulated by Bell and Krieger. The conference will deal with pottery types, definition of foci, and other information of concern within the Caddoan area.

The Ninth Plains Conference for Archaeology will be held on April 11 and 12, 1952, at the Laboratory of Anthropology, University of Nebraska. Paul Cooper of Missouri River Basin Survey, Smithsonian Institution, is chairman. Volume IV, Nos. 2-4, of the *Plains Archaeological Conference News Letter* contains papers on pottery types, a new type of projectile point, and animal bones by Donald J. Lehmer, Carlyle S. Smith, William Mulloy, and Richard P. Wheeler.

MEXICO

The University of Florida, with the aid of a grant from the Wenner-Gren Foundation, conducted a six-week field trip in Central and Southern Mexico ranging from Oaxaca to Michoacan. The party included Dr. and Mrs. John M. Goggin and two students.

The object was to survey and test colonial sites in order to obtain a stratigraphic picture of Colonial ceramics, especially majolica. A large series of surface collections was made and stratigraphic tests were dug at the *Convento* in Culhuacan, D.F. and in the *Convento* at Huejotzingo, Puebla. Colonial material was found in all cases overlying prehistoric deposits. A 10½ foot deep test at Culhuacan ranged from Colonial through Aztec, and Teotihuacan to Archaic. The tests at Huejotzingo have yielded a good majolica sequence. A study of private and public collections of majolica have broadened the archaeological perspective.

We call your attention again to INTERNATIONAL CONGRESS OF ANTHROPOLOGICAL AND ETHNOLOGICAL SCIENCES meeting in Vienna, September 1st to 8th, 1952. See Vol. 16, No. 2, p. 184 for details.

ERRATUM

Through the courtesy of T. Dale Stewart, this erratum concerning early man has been received. *American Antiquity* for July, 1945, carried an article by Kirk Bryan entitled "Recent work on early man at the Gruta de Cadonga [*sic*] in the Argentine Republic" (pp. 58-60). Consistently throughout this article the first letter "n" was dropped from the word *Candonga*. Because Bryan's review of this work is better known and more accessible in this country than is the original report of Alfredo Castellanos, there is danger of perpetuating this error.

SOME RECENT PUBLICATIONS*

A	*Antiquity*. Newbury, Berkshire, England.
AA	*American Anthropologist*, n.s. Menasha.
AHG	*Antropologia e Historia de Guatemala*. Guatemala.
AJA	*American Journal of Archaeology*. Menasha.
AMNH-AP	*American Museum of Natural History, Anthropological Papers*. New York.
APS-P	*American Philosophical Society, Proceedings*. Philadelphia.
Ar	*Archeology*. Cambridge, Mass.
ASC-B	*Archeological Society of Connecticut, Bulletin*. New Haven.
ASNJ-B	*Archeological Society of New Jersey, Bulletin*. Trenton.
BA	*Boletin de Arqueologia*. Bogota.
BBAA	*Boletin Bibliografico de Antropologia Americana*. Mexico.
CA	*Cuadernos Americanos*. Mexico.
CIW-NMAAE	*Carnegie Institution of Washington, Notes on Middle American Archaeology and Ethnology*. Washington.
CIW-P	*Carnegie Institution of Washington, Publications*. Washington.
CM-AN	*Carnegie Museum, Archeological Newsletter*. Pittsburgh.
CN	*Ciencia Nueva*. Tucuman.
CNHM-B	*Chicago Natural History Museum, Bulletin*. Chicago.
CS	*Ciba Symposia*. Summit.
EG	*Early Georgia*. Athens.
EP	*El Palacio*. Santa Fe.
ESAF-B	*Eastern States Archeological Federation, Bulletin*. Harrisburg.
FiA	*Fieldiana—Anthropology*. Chicago.
FlA	*Florida Anthropologist*. Gainesville.
ICA-P	*International Congress of Americanists, Papers*. 26th, Madrid. 29th, Vol. 1 (issued also under title "Civilizations of Ancient America") Chicago.
INAH-M	*Instituto Nacional de Antropologia y Historia, Memorias*. Mexico.
ISAS-J	*Illinois State Archaeological Society, Journal*. Springfield.
K	*Kiva*. Tucson.
M	*Man*. London.
MA	*El Mexico Antiguo*. Mexico.
MARI-P	*Middle American Research Institute, Publications*. New Orleans.
Mas	*Masterkey*. Los Angeles.
MAS-B	*Massachusetts Archaeological Society, Bulletin*. Attleboro.
MiA	*Minnesota Archaeologist*. Minneapolis.
MN	*Mesoamerican Notes*. Mexico.
MoA	*Missouri Archaeologist*. Columbia.
NRC-B	*National Research Council, Bulletin*. Washington.
NYAS-T	*New York Academy of Sciences, Transactions, Series 2*. New York.
OA	*Ohio Archaeologist*.
OIRCS-B	*Ohio Indian Relic Collectors Society, Bulletin*. Columbus.
OSAHQ	*Ohio State Archaeological and Historical Quarterly*. Columbus.
P	*Plateau*. Flagstaff.
PA	*Pennsylvania Archaeologist*. Philadelphia.
PAC-NL	*Plains Archaeological Conference, News Letter*. Lincoln.
PMAAE-P	*Peabody Museum of American Archaeology and Ethnology, Papers*. Cambridge.
PRI	*Puerto Rico Illustrado*. San Juan.
RAE	*Revista de Arqueologia y Etnologia*. Habana.
RAI-J	*Royal Anthropological Institute, Journal*. London.
RI	*Revista de Indias*. Madrid.
RMEA	*Revista Mexicana de Estudios Antropologicos*. Mexico.
S	*Science*. Washington.
SA	*Scientific American*. New York.
SAA-M	*Society for American Archaeology, Memoirs*. Salt Lake City.
SAP-J	*Societe des Americanistes de Paris, Journal*. Paris.
SAS-PB	*Sociedad Arqueologica de La Serena, Publicaciones, Boletin*. La Serena.
SIS	*Southern Indian Studies*. Chapel Hill.
SJA	*Southwestern Journal of Anthropology*. Albuquerque.
SL	*Southwestern Lore*. Boulder.
SM	*Scientific Monthly*. Washington.
TA	*Tennessee Archaeologist*. Knoxville.
TAPS-B	*Texas Archeological and Paleontological Society, Bulletin*. Lubbock.
TRB	*Tree Ring Bulletin*. Tucson.
UCAS-R	*University of California Archaeological Survey, Report*. Berkeley.
UC-PAAE	*University of California, Publications in American Archaeology and Ethnology*. Berkeley.
UK-RA	*University of Kentucky, Reports in Anthropology*. Lexington.
USD-MN	*University of South Dakota, Museum News*. Vermillion.
UMM-AP	*University of Michigan, Museum of Anthropology, Anthropological Papers*. Ann Arbor.
WA	*Wisconsin Archeologist*. Milwaukee.
WAS-J	*Washington Academy of Sciences, Journal*. Washington.
WVA	*West Virginia Archaeologist*. Moundsville.
YU-PA	*Yale University, Publications in Anthropology*. New Haven.
ZE	*Zeitschrift fur Ethnologie*. Braunschweig.

* The ASSISTANT EDITORS, as most readers of *American Antiquity* already know, are frequently asked to advise the editor on manuscripts bearing on sites or problems from their respective areas. Also, it is their anonymous editorial chore to gather, sift, and arrange (subject to further revision by the ASSOCIATE EDITOR, who fits material to varying space limitations) the important NOTES AND NEWS feature of each issue.

It should be pointed out that the over 600 titles included in SOME RECENT PUBLICATIONS in this issue were in large measure gathered by these same unsung assistant editors. The editor's contribution has been limited to arrangement and consolidation; also a few titles, not available to the assistants, have been added from publications sent directly to the editor through the courtesy of the publisher or of the author.

For the CARIBBEAN titles we are indebted to Irving Rouse.

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ERRATA

RADIOCARBON DATING

Memoir 8
Society for American Archaeology
July 1951

TABLE 1.

PAGE	COL.	SAMPLE NO.	CHANGE	TO
5	1	36-39,	"Osborne Zoological Laboratory"	Yale University
5	2	75	"Hurango"	Huarango
6	1	115	"H. H. von der Ostur"	H. H. von der Osten
6	1	119-122,	"Osborne Zoological Laboratory"	Yale University
6	2	137,	"56606"	56605
6	2	152	"Deuell"	Deuel
7	1	180	"180"	180*
7	2	191	"Lamoka focus"	Frontenac focus
8	1	204	"1944"	1945
8	1	205	"1944"	1945
8	2	216	"Sulphur Springs"	Sulphur Spring
8	2	254	"Indian Knoll, Ohio"	Indian Knoll, Ohio Co., Kentucky
9	2	365, 366, 536	"J. H. Bretz"	J H. Bretz
10	1	318b	"HB3"	HP3
10	1	332, 334, 335	"Osborne Zoological Laboratory"	Yale University
10	1	308	"11442 ± 350"	11404 ± 350
10	2	336	"Submitted"	Collected Submitted by E. S. Deevey, Jr., Yale University, New Haven
10	2	337	Delete, "the younger allerod"	
			"Submitted"	Collected Submitted by E. S. Deevey, Jr., Yale University, New Haven
10	2	341	"Allerod"	Alleröd
10	2	343	"of Neolithic Age"	of sub-Boreal age
			Delete, "Early"	
			"VII"	VIIb
10	2	347	"decay pool"	Decoy Pool
			Delete, "(cf. S.H. 8)"	
10	2	353	"Starr"	Star
11	1	355	"Knocknacran Co.,"	Knocknacran, Co. Monaghan
11	1	358	"Clonsast Co.,"	Clonsast, Co. Offaly
11	1	364	"Lacustrine"	lacustrine
			"(Tolleston or Algonquin level)"	(Toleston level)
			"H. Bretz"	J H. Bretz
11	2	409	"Pre-Aleut"	Paleo-Aleut
			"Uniak"	Umnak
			"W. F. Laughlin"	W. S. Laughlin
12	1	423	"Ciudadella"	Ciudadela
13	1	440, 522	"Windmille"	Windmiller
13	1	449	"Melback"	Melbeck
			"Grentz"	Grenz
			Delete "Peat"	
			"Submitted"	Collected Submitted by E. S. Deevey, Jr., Yale University, New Haven

ERRATA — RADIOCARBON DATING — Continued

PAGE	COL.	SAMPLE NO.	CHANGE	TO
13	1	450	"Melback"	Melbeck
			"Grentz"	Grenz
			"Submitted"	Collected
				Submitted by E. S. Deevey, Jr., Yale University, New Haven
13	2	462	"Ehenside"	Edenside
14	2	481	"15"	1
14	2	481	"beneath presumably Mankato till (last interglacial stage)"	beneath till (probably Cary) and loess
14	2	Footnote 2, last line	"corrections"	correction
15	2	511, 518, 519	"Sulphur Springs"	Sulphur Spring
16	1	526	"Lundby"	Lundy
			"Grass mere"	Grassmere
16	1	528	"528*"	528
16	1	535		Add, "This sample is believed to have been confused with another, cf. no. 575."
			"H. Bretz"	J H. Bretz
17	1	571, 572	"572†"	571
			"527†"	572
		571	"5000 to 7500"	5605 ± 290
17	1	575	"H. Bretz"	J H. Bretz
17	2	576	"of"	or
17	2	580	"Lupembian"	Lupemban
			"Comparrhia"	Companhia
			"Diamentes"	Diamantes
18	1 and 2	604	". . . in the field party of Paul L. Cooper, River Basin Surveys, University of Nebraska"	Submitted by Paul L. Cooper, River Basin Surveys, Smithsonian Institution, Lincoln, Nebraska

TEXT

PAGE	COL.	LINE	CHANGE	TO
20	2	4	"H. K. Sellards"	E. H. Sellards
22	2	21	"Bureau American Ethnology"	Bureau of American Ethnology
23	1	23	"William's"	Williams'
23	2	39	"dessication"	desiccation
34	2	38, 40	"Sulphur Springs"	Sulphur Spring
44	1	16	"(Kubler and Hutchinson, 1950)"	(Kubler, 1948; Hutchinson, 1950)
45	1	7	"seems"	seem
48	Table 2	3 and 4 from bottom	Delete both lines	
48	Table 2	2 from bottom	"2478 B.C."	2474 B.C.
60	1	10	"'heterogenous'"	"heterogeneous"
63	1	12	"1947"	1947a
65	1	after 6	Insert	Kubler, George, 1948 Toward absolute time: Guano archaeology. Memoir, Society for American Archaeology, No. 4, pp. 29-50. Menasha
65	1	7	"Kubler, George and E. Hutchinson"	Hutchinson, G. E.
Back Cover (inside)			"Big Mead Mesa"	Big Bead Mesa

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